UNDERSTANDING AND MANAGING INFANT SLEEP DISTURBANCE

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ERRATA

Pg 26, 2.1.3.3. line 3 should read : "to the extent that behaviour is measured indirectly and a hierarchy"

Pg 49, 3.3.1.8. Delete first sentence replace with paragraph: "The concept of temperament usually refers to stable differences between children in mood, sensitivity to stimulation and energy level. Temperament and other infant characteristics, however, are not defined in any of the studies which consider them. It is implicit in this work that temperament is an actual attribute of the child (Thomas, Chess & Birch, 1968), as distinct from a social perception or attribution (Bates, 1980). Carey (1980), for example, describes the role of temperament in infant sleep disturbance as "constitutional sensitiveness"(p.756) and Richman (1981b) cites literature which attributes certain temperamental traits to disturbances in the autonomic nervous system."

Pg 55, line 6, replace brackets with: (for example Blurton-Jones et al [1978] found that mothers of wakers picked up their children sooner and more often when they cried than did mothers of non-wakers and Ungerer et al [1983] found that wakers had more positive social interactions with their caregivers at ages 1mo. and 24 mo.)

Line 8 should read: "sub-optimal handling (minimal contact and play over and above that needed for feeding) at feeding time to be implicated as well.

Pg 120 end of first paragraph, insert: "The parents report of number and duration of awakenings was compared with the number and duration given on the record sheets for that day. For each reported awakening an agreement was scored if it was reported in both sources. If it was reported in only one source it was scored as a disagreement. Similiarly for duration, if the durations for each awakening reported in each source were within 5% of each other it was scored as an agreement, if there was more than 5% difference between them it was scored as a disagreement.

Parents learn by their mistakes; it is only when the children are grown up that one discovers how they ought to have been educated. I shall therefore relate an incident which shows the snares of over-indulgence. At the age of two and a half, my boy was put to sleep in a room by himself. He was inordinately proud of the promotion from the night-nursery, and at first he always slept quietly through the night. But one night there was a terrific gale, and a hurdle was blown over with a deafening crash. He woke in terror, and cried out. I went to him at once; he had apparently waked with a nightmare, and clung to me with his heart beating wildly. Very soon his terror ceased. But he had complained that it was dark—usually, at that time of year, he slept all through the dark hours. After I left him, the terror seemed to return in a mitigated form, so I gave him a night-light. After that, he made an almost nightly practice of crying out, until at last it became clear that he was only doing it for the pleasure of having grown-up people come and make a fuss. So we talked to him very carefully about the absence of danger in the dark, and told him that if he woke he was to turn over and go to sleep again, as we should not come to him unless there was something serious the matter. He listened attentively, and never cried out again except for grave cause on rare occasions. Of course the night-light was discontinued. If we had been more indulgent, we should probably have made him sleep badly for a long time, perhaps for life.

from B. Russell. (1926). On Education (p. 62). London: Unwin Books.

ABSTRACT

This thesis reviewed the major aetiological and treatment literature on infant sleep disturbance and concluded that the conceptual and methodological limitations of this literature have prevented progress in understanding the phenomenon. A model integrating the major findings of the literature was developed. The ethics of intervening to modify infant sleep disturbance were explored, in preparation for the experimental section.

There were four separate studies. The first evaluated extinction as an intervention for infant sleep disturbance and found it effective in reducing all aspects of infant sleep disturbance. These reductions were still evident at three months and two years follow-up. This study contributes to the literature through its use of a systematic multiple baseline design, its inclusion of reliability assessment and by confining its consideration to the more uniform developmental stage of infancy, rather than including infants and pre-schoolers together.

The second study evaluated two administration regimes for trimeprazine, a sedative widely prescribed for sleep disturbed infants in New Zealand. Trimeprazine increased the number of nights the infants slept through, however its effect was highly variable and in most cases not clinically significant. There was no evidence that use of the medication at either dose led to a lasting decrease in sleep disturbance. Study Two had the same strengths as Study One, and also contributes to the literature by its examination of a lower dose rate than any previously published study.

Study Three compared extinction alone as a treatment, with extinction plus trimeprazine and extinction plus placebo. It aimed to establish whether the use of trimeprazine would lead to less infant distress, more infant security and less parental anxiety during treatment. There was some evidence that the use of the drug led to

less infant distress, but an important finding was that infant security and maternal anxiety improved for all treated groups over time. This finding was important given some of the criticisms made against the use of extinction on ethical grounds.

Study Four directly measured a wide range of infant behaviours in a group treated with extinction and two control groups. There was no evidence that extinction had any negative side effects and some evidence in fact, that it had positive side effects.

This series of studies answered several important questions, particularly regarding the limitations of drug use and the efficacy and safety of extinction. The combination of these two treatments has provided another treatment alternative, particularly where parents are reluctant to use extinction. Several directions for future research were highlighted. These included not only the continued investigation of treatments for infant sleep disturbance, but also the factors determining whether a sleep disturbed infant presents for treatment and the effect of behavioural interventions on the development of infant sleep per se.

ACKNOWLEDGEMENTS

I am indebted to Mr N. M. Blampied for his interest and support from the beginning of this research. More recently, since his appointment as my supervisor, he has given time and shown patience unstintingly. I take full responsibility for the shortcomings of this work. Without his helpful comments these shortcomings would have been many more.

The initial part of this research was supervised by Dr N. Singh. I am grateful to him, particularly for his assistance in planning Study Two. My associate supervisor, Dr S. Kemp has made himself readily available when I have needed to discuss my data.

I am grateful to the research assistants I was fortunate to work with. Carolyn Lawton and Kevin Moesbergen gave immeasurable help with interviewing and keeping track of the progress of many subjects. Jill Husband competently delivered and collected control group questionnaires for Study Four. Tony Ward and Kevin Moesbergen assisted with the collection of reliability recordings in the first two studies.

Thanks are due to Dr P. Wilkinson who prescribed the medication to the children in Studies Two and Three despite heavy commitment to his medical practice. Also to the staff of the Templeton Pharmacy who coded the drugs and prepared the placebos for Study Two and to Mr B. Grant from Barry Grant Pharmacy who coded the drugs and prepared the placebos for Study Three. May and Baker Pharmaceuticals kindly supplied the trimeprazine tartrate used in both these studies.

Recruitment of the control groups for Study Four would not have been possible without the support of the staff at Dr Wilkinson's medical practice and the Barrington Medical Centre. The receptionists in particular were involved in extra work on my behalf.

The support I received from the nurses from the Canterbury Branch of the New Zealand Plunket Society was overwhelming and has led to an on-going and highly satisfying association. I am grateful to Dr T. Casely for assisting the liaison between myself, the Royal College of General Practitioners and the Plunket Nurses.

The parents of the infants used as subjects in this work laboured long and hard completing diaries, in many cases for protracted periods. This research could not have been completed without this consistent effort. The control group parents tolerated an invasion on their privacy and extensive paperwork with no apparent gain to them. For that I am most grateful. Thanks to the babies for being there!

The preparation of many figures benefited immeasurably from the skill and application of Mr R. Phillips. I received considerable help from interloans staff at the University of Canterbury Library and at the Canterbury Medical Library. Mr R. Irwin, in particular, facilitated literature searches on many occasions.

The head of the Psychology Department, Professor K. Strongman readily supported applications for research assistance and for the extension of deadline which was necessary after my illness.

My husband Steve helped in every way possible. He was a sounding board for my ideas, a critic of my style and a motivator when progress was slow. He was referee in my tussles with my computer and provided practical help, from assistance with editing to trips to the library. He carried an extra burden at home too. My children, Ben and Chloe, have shown remarkable patience and understanding. My parents, parents-in-law and friends have supported me in many ways. Thank you all.

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SECTION ONE : LITERATURE REVIEW

CHAPTER ONE

THE NATURE OF INFANT SLEEP DISTURBANCE

1.1. DEFINITIONS AND MEASUREMENT

1.1.1. Terms Used in the Study of Infant Sleep:

Many studies address the development of the sleep of young children. They fall broadly into two categories. The first category aims to describe normal infant sleep, usually in order to explore conceptual or clinical aspects of its development. This literature is referred to in Section 1.2 below. The second category considers aspects of infant's sleep which are considered to be problems.

This section presents an overview of the terms used in this infant sleep literature and an orientation to the way they are used within this thesis. In choosing terms to use in this research from the variety of terms available, several principles have been adhered to:

1. They must be made readily operational. "Bed-time delay" is able to be quantified using a unit of time and therefore is a preferable term to " bedtime struggle" or "bedtime resistance" where no unit of measurement is readily available.

2. Aspects of sleep disturbance quantified in this research have been labeled in a manner consistent with the measure used. For example the "time spent in the parent's bed" has been emphasized in preference to Kataria, Swanson and Trevathan's (1987) term "co-sleeping with parent or sibling" as the time spent in the parents' bed is measured in Richman's (1981a, 1985) Sleep Behaviour Scale which is used in this thesis.

3. Where possible, terms used frequently in the literature have been adhered to in order to facilitate comparison and communication. Night waking has therefore been retained as a term despite "sleep initiation difficulty" being a more accurate description of the problem, given that many children wake but go back to sleep without intervention (Ferber & Boyle, 1983).

1.1.1.1. Terms used in studying the development of normal infant sleep:

Studies considering the normal development of infant sleep vary in which terminology is used to describe sleep stages. Some studies use the same terminology as is used in the adult literature, that is, REM (Rapid Eye Movement) and NREM (Non-Rapid Eye Movement) sleep and stages 1, 2, 3 and 4. Anders and Weinstein(1972), express reservations about using the same terms, such as REM, to describe infant parallels to adult sleep states. Given the differences between infant and adult sleep (see Section 1.2) they describe a new nomenclature to describe infant sleep stages specifically. Infant sleep is divided into "active sleep" (which contains REM sleep) and "quiet sleep " (which includes the NREM sleep stages which have developed by infancy). In reviewing this literature, the terms presented vary with the terms used in the original article being considered.

1.1.1.2. Definition of infancy:

For the purposes of this research infancy is defined as being between the ages of 6 and 24 months. From 24 to 60 months is called the pre-school period. This research is confined to infancy because:

1. Within these limits the presentation of sleep disturbance is uniform. Beltramini and Hertzig (1983), among others, have found that the relative frequency of certain aspects of sleep disturbance change in older children (see Tables 1 and 2 below).

2. Between these ages the physiological substrate of sleep is relatively uniform. Anders (1979) describes the sleep organization of children after age 2 as more closely approximating that of adults.

3. Between these ages the options for behavioural management are uniform. After the age of 2, management options increase with the onset of language to include reinforcement delayed until the morning. Because of this, the management of sleep disturbance in older children requires separate consideration.

4. A lower limit of 6 months was chosen for the definition of sleep disturbance because it is well past the age that the majority of infants sleep through the night without requiring feeding (Moore & Ucko, 1957). It would seem reasonable, from a developmental perspective, to expect infants to sleep through the night after this point.

The age range considered in the infant sleep literature varies from 3-60 months. Jenkins Bax and Hart (1980) and Werry and Carlielle (1982) are both examples of studies with a wide age range. In citing this literature, therefore, it has not always been possible to separate

information pertaining to infant sleep disturbance from that pertaining to pre-school sleep disturbance so both these phenomena have often to be considered together.

1.1.1.3. Definition of sleep disturbance in infancy:

The term "sleep disturbance" has been used in this research but it is synonymous with and has been used interchangeably with "sleep problems" in the literature (Bernal, 1973; Kataria, et al., 1987; Ragins & Schachter, 1971; Van Tassel 1985). Another synonym used occasionally is "sleep disruptions" (Richman 1981a).

"Sleep disturbance" is defined in the relevant literature as behaviours associated with sleep which have been designated a problem by parents. All the studies summarized in Table 1 introduce their consideration of infant sleep disturbance with a statement about the effect of the behaviours on parents, although often parents are not asked whether their children's sleep pattern is troublesome (e.g., Moore & Ucko ,1957). Other studies do ask whether parents (usually mothers) are concerned about their infants' sleep disturbance (Basler, Largo & Molinari, 1980; Ragins & Schachter, 1971; Richman, 1981a). An occasional paper such as Jenkins, Bax and Hart (1980) adds a clinical evaluation to the rating of severity. These findings will be discussed further below.

It is important to stress that the aspects of infant sleep included in this area of literature are not thought to be abnormal or pathological (especially as they appear in a large number of infants). They are aspects of healthy infants' sleep which have been considered troublesome or problematic and as such are often considered along with other behaviour problems (Jenkins, et al., 1980; Richman, Stevenson & Graham, 1975). The ethical aspects of labeling common childhood behaviours as problematic are explored in Chapter Five.

There are problems with relying on parents' concern as the only criterion of sleep disturbance or its severity as it is possible that parent's expectations of their children may be unreasonable. Parents may express concern about features of their child's sleep which are developmentally and statistically quite normal and not producing any problem evident to an outside observer, other than parental anxiety or concern. Conversely, parents may not at first express concern about behaviours which can be shown to them to be occurring with sufficient frequency and intensity to have clearly negative effects on the child and perhaps other family members. For this reason, a clinical screening procedure was used in this research to ensure that children selected for the study had both evident sleep problems and appropriate parental concern.

1.1.1.4. The components of sleep disturbance in infancy:

The behaviours which have been included in the infant sleep disturbance literature vary in the terminology used to describe them, but can generally be subsumed under general headings according to the stage of sleep routine they are associated with. Terms used in this thesis and their definitions are as follows:

1. "Bed-time delay": this is difficulty getting a child to bed variously called "bedtime struggle" (Kataria, et al., 1987), "going to bed problem" (Richman, 1981a), "resisting bed" (Werry & Carlielle, 1982), "difficulty settling" (Jenkins, et al., 1980; Richman, et al.,1975) and "bed-time resistance" (Ragins & Schachter, 1971).

2. "Sleep onset delay" or "sleep latency": this is an excessive amount of time from being placed in bed to sleep onset. Most studies consider this a problem if it is of more than 30 minutes' (Beltramini & Hertzig, 1983) or one hour's (Ragins & Schachter, 1971) duration. It is

variously called "sleep refusal" (Kataria et al., 1987) "sleep latency" (Beltramini & Hertzig, 1983; Ragins & Schachter, 1971) "going to sleep problem" and "delayed sleep latency" (translation from the original German) in Basler, et al. (1980). Some of the definitions of bed-time delay are sufficiently ambiguous that it is not possible to clarify whether they include sleep onset delay as part of the definition. These include: "resisting bed", "difficulty settling" and "bed-time resistance". Unfortunately, it is not possible from the original articles to further specify their meaning as the concepts are used in different situations to refer to different behaviours. The studies also fail to consider what parental interventions occur during sleep onset delay. If a child is removed from bed during this period it may be conceptualized as sleep onset delay or, alternatively, as bedtime delay.

3."Night waking": this refers to awakening, with calls for parental attention, occurring at any time from the initial onset of sleep to the time the child is removed from bed in the morning. This is the most consistently considered aspect of infant sleep disturbance and is usually termed "night waking" although its converse "settling" (sleeping through the night) has also been used to describe this aspect of infant behaviour (Moore & Ucko, 1957). The term "spontaneous awakening" has recently been used to refer to the same phenomenon (Rickert & Johnson, 1988). Although there is more consensus on the definition of night waking than with some other terms, there is still some ambiguity. Anders (1982) describes well the dilemma in defining night waking as a sleep disturbance. Earlier work (Anders, 1979) had demonstrated clearly that the vast majority of infants wake consistently during the night but that most of these awakenings are undetected by parents. It is waking with demands for parental attention which presents problems for parents. Ferber and Boyle

(1983) have underlined this point to the extent that they have suggested that "sleep initiation difficulty" is a preferable term. Anders (1982) further points out that the impact of waking on parents varies according to the time of night the waking occurs with waking during parents' sleep being the most disturbing. This point of view underlies the approach taken by Basler et al. (1980), Moore and Ucko (1957) and Van Tassel (1985), who restrict the time of night considered to the period parents are usually asleep. There are however problems associated with defining night waking in terms of its impact on parents alone. Most infants wake during the time that they are in bed (Anders, 1979). Some infants wake and call for attention rather than go back to sleep on their own. A particularly useful way of looking at this aspect of infant sleep is that for these infants, parental attention becomes a discriminative stimulus for the resumption of sleep with other babies responding to more appropriate cues. In this case the time of night is irrelevant and should not be part of the defining criteria.

4. "Parent's bed" or "time spent in the parents' bed": this refers to whether a child sleeps in his or her own bed all night or leaves it to join his or her parents (or other family member) in their bed. Kataria et al. (1987), who call it "co-sleeping", and Richman et al. (1975) include this among their criteria for sleep disturbance. Richman's (1981a, 1985) term "time spent in parents' bed" (where necessary shortened to "parent's bed") has been used in this thesis because it is one of the categories included in her Sleep Behaviour Scale which has been used as a measure in this thesis.

5. "Curtain calls": Beltramini and Hertzig (1983) have used this term to refer to demands for parental attention during the period of sleep onset delay. They also state that it occurs more frequently in older

children than infants and as such has not been considered, independently from sleep onset delay, in this thesis.

There are two other dimensions of infant sleep disturbance which are mentioned occasionally in the prevalence literature. Firstly, sleeping with a favourite toy or with a night light (Beltramini & Hertzig, 1983). This is more appropriately considered as a factor associated with sleep disturbance. Secondly Richman (1981a,1985) includes the total amount of sleep which an infant has in one day in her Sleep Behaviour Scale. This is less for sleep disturbed children than for children who are sleeping well and is included as a measure in this research as part of the Sleep Behaviour Scale.

1.1.2. The Measurement of Infant Sleep Disturbance:

Studies considering infant sleep disturbance measure it in the following ways: (a) questionnaires covering aspects of the infant's current sleep patterns (Holliday, Sibbald & Tooley, 1987; Kataria et al. 1987; Ragins & Schachter, 1971; Richman, 1981a); (b) retrospective interviews covering aspects of the infant's previous sleep pattern (Ferguson, Shannon & Horwood, 1981; Holliday et al., 1987); (c) interviews of the infant's parents regarding history and current aspects of the infant's sleep pattern (Basler, et al., 1980; Beltramini & Hertzig, 1983; Bernal, 1973; Blurton-Jones, Rosseti-Ferreira, & Farquar-Brown, 1978; Jenkins, Bax & Hart, 1980; Kataria et al., 1987; Moore & Ucko, 1957; Ragins & Schachter, 1971; Richman, et al., 1975; Van Tassel, 1985; Werry & Carlielle, 1982) and/or (d) daily diaries in which parents record various aspects of their infant's sleep pattern (Bernal, 1973; Ragins & Schachter, 1971; Richman, 1981a). The only study in which direct observation of the infant's behaviour is reported is that of Anders (1979) who used time lapse video recording to

observe the infant's sleep in his/her home. A high correlation, however, was found between the video results and parents' daily diaries.

While a variety of measures have been used in the literature investigating management techniques in infant sleep disturbance, a combination of diary and interview is the most common measure used(Bidder, Gray, Howells & Eaton, 1986; Johnson, Bradley-Johnson & Stack, 1981; Jones & Verduyn, 1983; Lawton, 1985; McGarr & Hovell, 1980; Moesbergen, 1987; Richman, 1985; Richman, Douglas, Hunt, Lansdown & Levere, 1985; Rickert & Johnson, 1988; Rolider & Van Houten, 1984; Seymour, 1987; Seymour, Bayfield, Brock & During, 1983; Simonoff & Stores, 1987; Sanger, Weir & Churchill, 1981; Weir & Dinnick,1988; Weissbluth, 1982) with a questionnaire being used in addition by Sanger et al. (1981) Seymour (1987) and Weir and Dinnick (1988). Direct measures of infant (Moesbergen, 1987) and infant and parental behaviour (Lawton, 1985) have been used to establish reliability of daily diaries which were filled out by parents. Using a voice activated event recorder (Lawton, 1985; Moesbergen, 1987) and a pressure activated foot pad (Lawton, 1985) they were able to measure infant crying and parental attends respectively. They found a high correlation between these measures and parental reports of infant crying and parental attendance to the sleep-disturbed infant.

1.2. THE DEVELOPMENT OF SLEEP IN INFANCY

The sleep of the infant is markedly different from that of adults (Anders, 1979; Anders, Keener, Bow & Shoaff, 1983; Coons & Guilleminault, 1982, 1984; Fagioli & Salzarulo, 1982; Ferber, 1985a, b; Hoppenbrouwers, Hodgeman, Harpur & Sterman, 1982; Jacklin, Snow, Gahart, & Maccoby, 1980; Kohler, Coddington & Agnew, 1968;

Sostek & Anders, 1981). In contrast to that of adults it is characterized by a greater number of transitions from sleep to wakefulness (Jacklin et al., 1980); smooth transitions from one stage to another (Kohler et al., 1968) and a much higher proportion of REM sleep or " active sleep" (Anders & Weinstein, 1982) which may occur at sleep onset (Coons & Guilleminault, 1984; Anders, 1979) and is spread at regular intervals throughout the night rather than being clustered predominantly in the latter third of the night as in adult sleep (Ferber, 1985b). The development of REM/NREM sleep organization over infancy and early childhood maybe of considerable developmental significance in that Kohler, et al. (1968) claim a correlation between this development and a child's mental or developmental age. Anders and Weinstein (1972) further describe the belief that REM sleep may have the important role of stimulating the CNS during uterine and early post-natal development when external stimulation is limited. The sleep of the preterm infant of less than 34 weeks gestation is predominantly "indeterminate" sleep which is not clearly able to be differentiated into REM or NREM equivalents although Ferber (1985b) claims that clear REM phases can be measured in the foetus. From 34 weeks gestation established REM/NREM cycles can be detected. These cycles last 35 minutes at 34 weeks gestation, 45-50 minutes at term and gradually increase until adolescence and adulthood when they last 90-100 minutes. The neonate still has some periods of undifferentiated sleep and an equal representation of REM and NREM throughout sleep periods.

Between 3 and 6 months of age marked changes occur. The number of awakenings decrease (Kohler et al., 1968) and at 3 months 70% of infants are sleeping through the night without detectable awakening. This figure rises to 83% at 6 months (Anders, 1979; Moore & Ucko, 1957). The proportions of REM/NREM within sleep cycles change by

NREM sleep increasing during the night and REM sleep decreasing during the day (Fagioli & Salzarulo, 1982; Coons & Guilleminault, 1984), although Hoppenbrouwers et al. (1982) found that REM sleep increases in the latter part of the night also. Anders et al. (1983) describe the consolidation of REM in the latter half of the night. The diurnal rhythm changes so that there is an increased likelihood of the infant being awake during the day and asleep at night (Coons & Guilleminault, 1984; Anders & Weinstein, 1972), until by approximately six months of age the longest period of sleep changes from being a random occurrence to follow the longest awakening, starting at approximately 20.00 hours (Coons & Guilleminault, 1982; Anders & Weinstein, 1972). This long sleep is one from which the child can be woken only with difficulty (Ferber, 1985b). During this developmental period there are fewer instances of REM in the sleep onset period (Coons & Guilleminault, 1982), growth hormone and cortisol secretion becomes related to sleep stages (Anders & Weinstein 1972) and up to 70% of infants settle with no detectable awakenings during the night (Anders et al., 1983).

From 6 months until 2 years fewer changes occur. The longest period of wakefulness continues to increase and the daily frequency of sleep/wake transitions decreases between 6 months and 33 months of age (Jacklin et al., 1980). Kohler et al. (1968) describe several characteristics of the sleep of two year olds. They have less REM sleep than younger infants but still considerably more than adults, they retain the younger infant's ability to make a smooth transition between sleep stages in contrast to the adults transitions which can jump stages and, although stage 3 sleep has yet to emerge, they have more stage 4 sleep than adults. Although by 1 year of age 90% of babies have slept through the night for a sustained period, 50% of

these have reverted to awakening again. (Anders et al., 1983; Moore & Ucko, 1957).

Unfortunately, although this area of literature is marked by a high methodological standard, its focus is very narrow in that little or no consideration is given to the possible interaction of environmental events with sleep pattern development. Studies such as those by Coons and Guilleminault (1982, 1984), Fagioli and Salzarulo (1982), Hoppenbrouwers et al. (1982), Kohler et al. (1968) are conducted in the laboratory using a variety of physiological measures such as electroencephalogram, electromyogram, and/or electrocardiogram recordings or in the child's home using diaries (Jacklin et al., 1980) or Anders and Weinstein's (1972) videotaping technique (Anders 1979). Anders, Carskadon and Dement (1980) describe their reservations about infants' sleep being measured in a laboratory setting and cite Bernstein, Emde and Campos (1973) as evidence for the extent to which the laboratory settings and procedures disrupt infant sleep, even over an extended period. Kohler et al. (1968) discard the first day's (of four) laboratory recording in order to give token acknowledgement to this variable but other laboratory recorders record only for a 24 hour (Coons & Guilleminault, 1982, 1984; Fagioli & Salzarulo, 1982) or 12 hour (Hoppenbrouwers et al., 1982) period thus not allowing for the child's sleep pattern to adjust to the new surroundings or the equipment.

Similarly the effect of parental attendance on the child is rarely considered. It is measured by Anders (1979) who differentiated "simple" and "complex" awakenings depending on whether the child was taken from his/her cot and Fagioli and Salzarulo (1982) and Hoppenbrouwers et al. (1982) who noted feeding. It is not measured in some papers (Coons & Guilleminault, 1982, 1984; Kohler et al., 1968; Jacklin et al., 1980). Even although it is noted in some studies, in

no case is the possible impact of parental attends on, or interaction of parental attends with, the development of infant sleep considered.

CHAPTER TWO

THE PREVALENCE, PERSISTENCE AND EXTENT OF INFANT SLEEP DISTURBANCE

2.1. PREVALENCE AND PERSISTENCE STUDIES

2.1.1. The Prevalence of Infant Sleep Disturbance:

The findings of studies considering the prevalence of infant sleep disturbance are presented in Table 1.

2.1.1.1. Night waking:

The vast majority of studies considering the prevalence of night waking describe between 20% and 37% of infants waking regularly. Although these studies include different criteria including: number of wakings per night, number of wakings per week, the amount of the night considered and the duration of the behaviour, these prevalences are, with few exceptions, remarkably consistent. For example a similar number of children wake nightly, or 2-4 nights per week (Beltramini & Hertzig, 1983; Richman, 1981a).

Results outside of this 20%-37% range are explicable when the criteria used by the authors are considered. Studies which include waking which occurs only once each week as a criterion of sleep disturbance result in higher prevalence figures (Moore & Ucko, 1957; Ferguson et al., 1981; Werry & Carlielle, 1982; Beltramini & Herzig, 1983) than studies with more rigid criteria. Ragins and Schachter's (1971) relatively low results of 10% are explicable in that they include an additional criterion namely, "difficulty returning to sleep". Ragins and Schachter's (1971) paper also demonstrates the difficulties in interpretation of prevalence studies created by difference in wording

and emphasis and the consequent implications for interpreting studies where wording and criteria are not even specified. In their study, different responses were received to similarly worded questions. For example, 50% of mothers were included by this item:

> "some degree of concern expressed by mother about child's night-time waking during past 3 months."

But only 27% of mothers were included by this item:

> " reported present worry over their child's sleep"

Jenkins et al. (1980) reported that 5% of infants wake 2-3 nights per week. This low figure is superficially more difficult to explain. It is possible, however, that there are fewer children who wake 2-3 nights a week than who wake either 1 or greater than 3 nights, which are frequencies often considered by other studies. The distribution of night waking may be bimodal with most children waking for either 1 or greater than 3 nights per week. If this is so, night waking is a phenomenon which occurs either intermittently or at a high frequency, the latter group being of particular interest in this research.

2.1.1.2. Sleep onset delay and bed-time delay:

Figures for sleep onset delay and bedtime delay are generally lower, 3 to 13% depending on whether they have been considered separately or together. One exception is Beltramini and Herzig (1983) who report a prevalence of 37% for sleep onset delay of 30 minutes or more.

Table 1. The prevalence (prev) of infant sleep disturbance

AUTHORS	N	SOURCE	AGES (MONTHS)	CRITERIA	MEASURE	PREV
Anders (1979) U.S.A.	32	Birth Column	9	NIGHT WAKING With parental intervention > 1 per night (complex) (total record time)	Timelapse video	25%
				Without parental intervention > 1 per night (simple) (midnight-5a.m).		62%
Basler, Largo & Molinari (1980) Switzer-land	320	Zurich Longit'l Study	18-60	1. Mother's indication of sleep disturb-ance	Interview	
				NIGHT WAKING		25%
				SLEEP ONSET DELAY		7%
				2. Description of sleep pattern per.se.		
				NIGHT WAKING occurring during parent's sleep		
				< 1 per night		20%
				> 1 per night		19%
				SLEEP ONSET DELAY regular (unspecified)		5%
Beltramini & Hertzig (1983) U.S.A.	109	New York Longit'l Study	12-60	NIGHT WAKING >1per week	Interview	57%
				>1per night		29%
				SLEEP ONSET DELAY >30 minutes		35%
				BEDTIME DELAY Bedtime routine >30 minutes ["Curtain calls" demands for parental attends]		9%

Table 1. continued

AUTHORS	N	SOURCE	AGES (MONTHS)	CRITERIA	MEASURE	PREV
Bernal (1973) U.K.	77	Unspec-ified Medical low risk group	14	NIGHT WAKING Mothers description regular: at present or recently improved	Interview/ 2 nights diary	31%
Blurton-Jones, Rosseti-Ferreira, Farquar-Brown (1978) U.K.	59	Health Visitors	15-27	NIGHT WAKING > 2 per week	Interview	23%
Ferguson Shannon & Horwood (1981) N.Z.	1156	Birth Cohort	24	NIGHT WAKING 1per week Chronic(never settled) Irregular (waking stopped and relapsed at some period) Late wakers (waking started after 12months)	Retro-spective Interviews	11% 17% 19%
Holliday Sibbald & Tooley (1987) U.K.	116	clinic	18-30	NIGHT WAKING > 2 most nights > 3 nights/week Recollection of waking at 1year >1 most nights [leaves bed>3 nights per week]	Quest'aire/ diary Retro-spective Interview	28% 37% 26%

Table 1. continued

AUTHORS	N	SOURCE	AGES (MONTHS)	CRITERIA	MEASURE	PREV
Jenkins Bax & Hart (1980) U.K.	418	All pre-school children in one urban area	6-60	NIGHT WAKING 2-3 nights per week	Interview	5%
				> 4 nights per week		20%
				SLEEP ONSET DELAY 2-3 nights per week		5%
				Most nights per week		13%
Kataria Swanson & Trevathan (1987) U.S.A.	60	Clinic	15-48	NIGHT WAKING >3 nights per week>1 month include crying and demands for parental attends	Quest'aire mail,'phone and direct interview	22%
				SLEEP ONSET AND BEDTIME DELAYS "Bedtime strug-gle": > 1 hour to settle & active protest & sleep refusal		13%
				PARENTS BED Co-sleeping with parent or sibling		16%
Moore & Ucko (1957) U.K.	104	Longit'l Study	4-12	NIGHT WAKING > 1per week midnight-5a.m Continuous in 1st. year(i.e. never settled)		10%
				Settled with relapse		43%

Table 1. continued

AUTHORS	N	SOURCE	AGES (MONTHS)	CRITERIA	MEASURE	PREV
Ragins & Schachter (1971) U.S.A.	48	Clinic & News-paper advert'	21-27	NIGHT WAKING S.Q. night waking with difficulty returning to sleep. duration over prior 3 months	Sleep Quest'aire (S.Q.) (covering behaviour of > 1 week	10%
				Interview: night waking of some concern during prior 3 months	Interview Sleep diary	50%
				SLEEP ONSET& BEDTIME DELAY S.Q. Sleep onset delay > 1 hour		15%
				Bedtime resistance		15%
				Interview: bed-time or sleep latency delay of some concern during prior 3 months		44%
Richman (1981a) U.K.	1158	Waltham Forest Family Register	24	NIGHT WAKING 2-4 nights per week	Mail Quest'aire Fixed time Period	24%
				5-7 nights per week	Sleep diary	20%
				Severe problem (>3 months duration, >5 nights per week and: >3per night or, waking >20 mins per night or going to parents bed.		10%

Table 1. continued

AUTHORS	N	SOURCE	AGES (MONTHS)	CRITERIA	MEASURE	PREV
Richman, Stevenson & Graham (1975) U.K.	705	Waltham Family Register	6	NIGHT WAKING > 3 times per week	Interview, Behaviour Screening Quest'aire (Richman & Graham 1971)	14%
				SLEEP ONSET DELAY Difficulty Settling		13%
				PARENTS BED		11%
Van Tassel (1985) U.S.A.	70	Birth column	15-27	NIGHT WAKING Presence of 1 night waking 10p.m.-6a.m.	Interview	27%
				SLEEP DISTURB overall unspecified		32%
Werry & Carlielle (1982) N.Z.	196	Utility Customer List	3-59	NIGHT WAKING >1per week	Interview	46%
				>3per week		33%
				SLEEP ONSET DELAY Not settling (unspecified)		6%
				BEDTIME DELAY Resisting bed (unspecified)		3%
Zuckerman Stevenson & Bailey (1987)	308	General Practices	8	NIGHT WAKING >3 per night	Interview	10%
				>1hour to settle after waking		8%
				Mothers' sleep disrupted		5%
				Any of these problems		18%

2.1.1.3. Time spent in the parents' bed:

Time spent in the parents' bed and or co-sleeping with a sibling is considered by Kataria, et al. (1987) who found a prevalence of 16%. Richman et al. (1975) obtain a figure of 11% for children sleeping in their parents' bed. It is also included as one of the criteria for the presence of a severe sleeping problem required by Richman (1981a) but it is not possible to extract the prevalence of this one aspect of sleep disturbance from her work.

2.1.1.4. Overall prevalence of infant sleep disturbance:

Only two of the papers cited in Table 1 have given an overall prevalence of sleep disturbance generally as opposed to separate figures for the component behaviours. Zuckerman, Stevenson and Bailey (1987) found that 18% of their sample either woke three times a night, took an hour to settle after awakening or severely disrupted their mothers' sleep. Kataria et al. (1987) give a figure of 42% of infants as having some sleep disturbance with little overlap between night waking and bedtime struggle (more than 1 hour to settle with active protest and refusal to sleep). Only 7% of children are reported as having both night waking and bed-time struggle. The prevalence of bed-time struggle is lower than night waking, so it is possible that children with bedtime struggle do have a high rate of night waking but not necessarily vice versa. This question cannot be answered without further research.

2.1.2. <u>The Persistence of Infant Sleep Disturbance:</u>

One important question which must be answered when considering management of infant sleep disturbance is, "over what period of the infant's life does the problem extend?" This question is addressed in several ways:

Table 2. The persistence of infant sleep disturbance

AUTHORS	AGE	TYPE	DIMENSION	PREV > 24 (< 24)
Basler, Largo, & Molinari (1980)	18-60	Longitudinal (follow up at 36 48&60 months)	Mothers indication of sleep disturbance	
			NIGHT WAKING	25% (25%)
			SLEEP ONSET DELAY	6% (7%)
			Description of sleep pattern per se	
			NIGHT WAKING	
			< 1 per night	21% (20%)
			> 1 per night	18% (19%)
			SLEEP ONSET DELAY	3% (5%)
Beltramini, & Hertzig (1983)	12-60	Longitudinal (follow up at 36 48,& 60months)	NIGHT WAKING	
			> 1 per week	64% (57%)
			> 1 per night	27% (29%)
			SLEEP ONSET DELAY	65% (35%)
			BEDTIME DELAY	35% (9%)
Jenkins,Bax & Hart (1980)	6-60	Cross sectional 36, 53 months	NIGHT WAKING	
			2-3nights per week	3% (5%)
			>4 nights per week	10% (20%)
			SLEEP ONSET DELAY	
			2-3nights per week	5% (5%)
			most nights/week	6% (13%)

Table 2. continued

AUTHORS	AGE	TYPE	DIMENSION	PREV > 24 (< 24)
Kataria, Swanson & Trevathan (1987)	15-48	Longitudinal (follow up at 36 months)	NIGHT WAKING	23% (22%)
			SLEEP ONSET & BEDTIME DELAYS	13% (13%)
			PARENTS BED	23% (16%)
Richman, Stevenson & Graham (1975)	36	Cross sectional	NIGHT WAKING 36 months only	14%
			SLEEP ONSET DELAY	13
			PARENTS BED	11%
Van Tassel (1985)	15-27	Longitudinal (follow up after 9-12 months)	NIGHT WAKING	39% (27%)
			SLEEP DISTURB. (unspecified)	44% (32%)
Zuckerman, Stevenson & Bailey (1987)	8	Longitudinal, (follow-up at 36 months)	SLEEP DISTURB. difficulty getting to bed and/or falling asleep or staying asleep.	29% (18%)

2.1.2.1. Studies which include persistence as part of their defining criteria:

Kataria et al. (1987) include a duration of greater than one month in their criteria for defining sleep disturbance with no apparent effect on prevalence. Ferguson et al. (1981), similarly, used a minimum of three months duration as a criterion for parents retrospective accounts of night waking. Their 11% figure for "chronic" wakers indicates that there is a group of children who never settle to sleep during the night in the first two years.

2.1.2.2. Longitudinal and cross sectional studies:

The results of longitudinal and cross sectional studies tracking children after the age of 2 years are presented in Table 2. Moore and Ucko (1957) show clearly that a large group of infants (47%) settle, only to relapse within the first 14 months, but did not track their sample past this age.

In all longitudinal studies tracking children past the age of 2 years older, children exhibit equal or greater rates of sleep disturbance to those reported when they were younger (Basler et al., 1980; Beltramini & Hertzig, 1983; Kataria et al., 1987; Van Tassel,1985). Beltramini and Hertzig (1983) report a marked increase in sleep onset delay and bedtime delay in older pre-schoolers compared with infants, however this is not reported in other studies. Unfortunately these longitudinal studies, on the whole, do not clarify whether the same children are waking at the various ages considered. Although a similar percentage wake at age 3 years as at age 1 year it is not possible to tell whether these are the same children. One exception is the paper by Kataria et al. (1987) who divided their sample into those with and those without sleep disturbance at the first interview and tracked them separately. They found that 84% of their sleep problem group were still exhibiting sleep disturbance after 3 years. Kataria et al. (1987) found a higher rate of sleep disturbance after three years than Zuckerman et al. (1987) who, using more rigid criteria, found 41% of infants with sleep disturbance at 8 months to still have sleep disturbance at 3 years. The corresponding figure for infants in Zuckerman et al's (1987) study who did not have sleep disturbance at 8 months was 26%.

Richman, et al's (1975) cross-sectional study considered the prevalence of sleep disturbance in a group of three year old children and found it to be approaching the prevalence of that in younger

children. With the exception of Jenkins et al's (1980) cross-sectional study results, there is no evidence that the prevalence of infant sleep disturbance decreases over time. This can be explained by considering Jenkins et al's original data. Their composite result presented in Table 2 includes an inexplicable decrease in prevalence at age two with a resurgence by age three to 14%. This consequently decreased the average result presented in Table 2.

2.1.2.3. Studies which associate later infant sleep disturbance with earlier infant sleep disturbance:

Further information on the persistence of infant sleep disturbance can be gleaned from studies considering factors associated with infant sleep disturbance. These studies are summarized in Table 3. Several studies (Bernal, 1973; Blurton-Jones et al., 1978; Chavin & Tinson, 1980; Holliday, et al., 1987; Kataria, et al. 1987; Moore & Ucko, 1957; Ragins & Schachter, 1971) report a correlation between sleep disturbance at a certain age and sleep disturbance occurring earlier in the child's life. This demonstrates that children with sleep disturbance are likely to have been sleep disturbed previously.

2.1.3. Methodological Drawbacks of Prevalence and Durability Studies:

2.1.3.1 Samples used:

In general there have been good attempts to obtain representative samples of infants in this area of research. Many studies have used birth cohorts or representative samples being used in existing longitudinal studies (Basler et al., 1980; Beltramini & Herzig, 1983; Ferguson et al., 1981; Moore and Ucko,1957; Richman, 1981a; Richman et al., 1975) . Other studies have used other approaches to obtain a normal as opposed to a clinical sample, for example Werry and Carlielle (1982) used the local electricity suppliers' roll of users

while Van Tassel (1985) tapped birth notices in a local newspaper. Clinical samples such as pediatric clinics have also been used (Kataria et al., 1987) but these studies have yielded similar results.

2.1.3.2. Lack of direct measures:

There have been very few prospective or direct recordings of the behaviour in question. Even the use of daily diaries is rare. Few authors justify these failings but those that do, do so in the light of statements that the reliability of parental reports of infant sleep behaviour is well established when compared with direct recordings of infant sleep (Werry & Carlielle, 1982; Van Tassel, 1985). Most of the evidence cited in support of this is from studies using diary records as a validity check against retrospective interview data (Bernal, 1973; Moore & Ucko, 1957; Richman, 1981a). These studies generally report good association between these two measures. Ragins and Schachter however found when comparing daily logs against questionnaire and interview responses, that mothers consistently underestimate the regularity of bedtime and of night wakings and overestimate sleep onset delay and bedtime delay. One study has validated daily diaries against direct observation of infant behaviour using a videotape (Anders 1979) and a high correlation was found. However no studies are known to have established the reliability of interview with direct measures of infant behaviour.

2.1.3.3. Suggested hierarchy of measures:

Although there is some evidence that parental measures and direct measures of infant behaviour are highly correlated, error increases with the distance from the behaviour being measured and a hierarchy of desirable approaches can be constructed. Studies such as Anders (1979) which directly measure both infant and parental behaviour are the most desirable, particularly as he has fully established that waking

during the night in infants is a ubiquitous but often undetected phenomenon and it is only wakings of which parents are aware that are being measured. In the absence of such rigour, prospective parental measures of infant behaviour such as daily diaries (Bernal, 1973; Ragins & Schachter, 1971) are more desirable than using time specified interviews. Richman (1981a) for example limited mothers' recollections to the preceding two weeks. Daily diaries in turn are better than the general interviews used by the vast majority of studies and finally than retrospective interviews such as that reported by Ferguson et al.,1981) whose expectation that mothers accurately recall their infants sleep pattern at various ages, is unrealistic.

2.1.3.4. Lack of consistent definitions:

Comment has already been made regarding the effect of different wording, definitions and emphases on prevalence reported (see section 2.1.1). Similarly in most studies the time period asked about is very loosely defined. The full effect of this is difficult to ascertain as many studies either do not give these details or word questions to parents very generally. The available information regarding criteria used is summarized in Table 1.

2.2 INFANT SLEEP DISTURBANCE: EXTENT OF THE PROBLEM

Given the high prevalence of infant sleep disturbance and its association with normal development the question, "Is intervention to change it warranted?" can easily be asked. Several dimensions can be considered in answering this question: (a) Parents opinions of whether it is a significant problem can be ascertained. However this in and of itself must not be the sole criterion, as it is possible that parents expectations of their infant may be too high. (b) An

alternative criterion for judging the severity of sleep disturbance lies in the opinions of professionals such as health visitors and doctors involved in evaluating it. (c) The impact of the behaviour on the infant's family can be considered and (d) the impact on the child him or herself. If the impact on these parties is severe, particularly if it is severe enough to impact detrimentally on the child and the parent/child relationship, then intervention is justified, provided the intervention is not harmful in and of itself.

2.2.1. Parents Perception of the Behaviour as a Problem:

Most studies establishing the prevalence of infant sleep disturbance include a measure of parental (usually maternal) perceptions of the behaviour. These studies consistently report that between a quarter and a half of parents whose infant children demonstrate some sleep disturbance rate it as a problem (Basler et al., 1980; Ferguson et al., 1981; Holliday et al., 1987; Ragins & Schachter, 1971; Van Tassel, 1985). One contrasting result is that of Werry and Carlielle (1982) whose reported low rate of parental concern (approximately 5% of parents with sleep disturbed children) is hard to reconcile with the fact that 43% of their sample had sought help for their child's sleep disturbance.

A contrasting approach to the question has been taken by Chavin and Tinson (1980) who compared a group identified by health visitors as having a serious sleep problem with a control group. They found whereas all of the parents of the first group had indicated that their child's sleep disturbance was a problem, 30% of the 62 children in the control group presented sleep disturbance behaviours of a similar nature to those occurring in the referred group, but that on the whole these were not perceived as problems by the parents, who accepted them as being merely a part of child rearing.

In short sleep disturbance in infants is not necessarily considered to be a problem by parents although those who experience it as a problem generally have infants whose sleep disturbance is more severe than the infants whose parents do not consider it to be a problem.

2.2.2. Professional Opinions as to the Nature of the Behaviour:

A few studies have reported the perceptions of professionals working with the families regarding the severity of any sleep disturbance and its impact on the child and family. This approach can give additional information in the case of parents who are unaware of the impact the sleep disturbance is having on them. It also provides a measure of how comfortable and effective people in direct contact with the family are, in handling sleep disturbance, using existing management strategies.

Jenkins et al. (1980) found a large overlap between parental and clinical assessment of behaviour problems in children under 2 years but did not differentiate between sleep-related and other problems. Thomas, Bidder, Hewitt, and Gray (1982) asked Health Visitors to rate different behaviour problems in pre-school children. Sleep disturbance was perceived as the most commonly occurring behaviour problem, but also the most difficult to deal with and the most disruptive of family life.

2.2.3. Impact of the Behaviour on the Family:

Studies considering the impact on the family have looked at the association with maternal depression or "malaise", the disruption of others sleep and other aspects of family life and the extent to which parents feel the need to seek help.

2.2.3.1. Maternal depression or malaise:

An association with clinical measures of maternal depression or malaise has been reported by Richman (1981a), Van Tassel (1985) and Zuckerman et al. (1987) but not by Werry and Carlielle (1983) whose entire sample of mothers of young children showed a high rate of malaise symptoms overall, apparently unrelated to the presence of sleep disturbance in their infants. Zuckerman et al. (1987) however, concluded that the mothers' feelings of depression were not a consequence of the child's sleep problem. This conclusion was in marked contrast to that of Pritchard and Appelton (1988) who found an improvement in mothers' mental state as a direct result of successful treatment of the infants' sleep disturbance.

2.2.3.2. Disruption of others' sleep:

Holliday et al. (1987) and Basler et al. (1980) both cite complaints by parents about disturbance of the sleep of other family members as one measure of the impact of infant sleep disturbance. Van Tassel (1985) reports an association between infant sleep disturbance and disruption of maternal sleep patterns. Consideration of this aspect is taken further by Chavin and Tinson (1980) whose parents of problem sleepers reported severe fatigue as as a major problem.

2.2.3.3. Other impacts on the family:

The other major problem specified by Chavin and Tinson's (1980) sample was that of parental arguments which were seen as being related to infant sleep disturbance by 37% of their sample. Among other associated problems reported by this group were inability to leave the child (also cited as a problem by 50% of Richman's (1981a) group), detrimental effect on siblings and detrimental effect on the

marital relationship. Fifty one percent of Richman's (1981a) group cited their infants' sleep disturbance as a significant stressor.

2.2.3.4. Need to seek help:

An additional measure of the impact infant sleep disturbance has on parents is whether they feel the need to seek help. Almost half of Werry and Carlielle's (1982) group with sleep disturbance had discussed the problem with someone else. Werry and Carlielle (1982) also found that medical practitioners figure low in the list of who is consulted so Ferguson et al's (1981) figure of 11% who consulted doctors is not a true reflection of the need for advice within this group. It should be noted, however, that the mothers of chronic wakers were much more likely to seek medical advice. This is another indication of the important part severity plays in determining the extent to which infant sleep disturbance is perceived as a problem.

2.2.4. Impact of the Behaviour on the Child:

2.2.4.1. Development of other behaviour problems:

Richman (1981b) in an overview of the literature on sleep problems reports, using two previous studies, that behaviour problems were found in a third to one half of pre-school children with sleep disturbance. This figure is higher than the rate in children without sleep disturbance. Kataria et al. (1987) report a rate of 34% in sleep disturbed children compared with 16% in non-sleep disturbed children. Similarly, Zuckerman et al. (1987) found that children with persistent sleep problems were more likely to to have behaviour problems, especially tantrums. Other studies, for example Thomas, et al. (1982) describe a group of children who present with a constellation of behaviour problems including sleep disturbance. Although these children are pre-schoolers rather than infants, given that sleep disturbance tends to persist past infancy, it is possible that

infants with sleep disturbance develop behaviour problems as they reach the age that these are more common.

2.2.4.2. Extensive use of medication:

One disturbing aspect of infant sleep disturbance is the extent to which sedatives (usually antihistamines) are used with infants. Werry and Carlielle (1983) found that infants were the most extensive recipients of psychotropic medicines in the families they visited (35%). These infants were given sedatives for sleep disturbance occurring either on its own or in conjunction with upper respiratory tract infections. Holliday et al. (1987) found sleep disturbed infants received more medication than non-sleep disturbed infants and many authors, for example Richman (1981b), state that 25% of infants receive medication by 18 months, and cite Ounsted and Hendrick (1977) as the source of this figure but this figure cannot be confirmed when Ounsted and Hendrick's (1977) original article is consulted. A smaller group of severely sleep disturbed infants are more extensively medicated. Chavin and Tinson (1980) found that 71% of their group, referred because of a sleep problem, were given prescription medication which in many cases had been continued for more than a year, despite it being ineffective. Chavin and Tinson (1980) also point out that figures describing the amount of prescription medication consumed are severe underestimations of the total amount consumed because of the free availability of antihistamine sedatives over the counter. No measure of the use of these or the purpose to which they are put is available, although personal communication with one Christchurch, New Zealand, pharmacist revealed that more of these compounds are sold over the counter than dispensed on prescription. Weymouth Hudson and King (1987) cite Australian statistics which claim that 26% of children under 5 years of age in that country receive either cough medicine or sleeping pills. Moesbergen (1987) cites

correspondence with the New Zealand Health Department and estimates figures totaling over half a million dollars a year, for the cost of trimeprazine and promethezine prescriptions, the most commonly used child sleep sedatives. Unfortunately, these figures are of very limited usefulness as they do not differentiate the age of the person receiving them or the purpose for which they are given. However taking these figures in conjunction with Werry and Carlielle's (1983) finding that infants are those most likely to receive these compounds, it is clear that a large number of infants are sedated, at a considerable cost, particularly given that promethezine is also available without prescription.

2.2.4.3. Other impacts on the child:

Holliday et al. (1987), and Bernal (1973) describe how infants with sleep disturbance get less total sleep than other infants and Seymour , Bayfield et al. (1983) describe how sleep disturbed infants present as more irritable and "grizzly", possibly as a consequence of their sleep disturbance. Sleep disturbed infants are also less likely to be cuddled when they wake (Bernal, 1973; Blurton-Jones et al., 1978).
Another question needing further research is whether there is a link between infant sleep disturbance and child abuse. Only one study has addressed this directly. Eight percent of the 62 parents in Chavin and Tinson's (1980) study admitted they had abused their sleep disturbed children. Reviews considering the role of the child in abuse mention crying, behaviour problems, some difference in the child , and temperament as factors (Freidrich & Boriskin, 1976). Kempe (1976) mentions the importance of infant crying and disruptions to routines as stress factors that may lead to abuse. Kirkland (1981) also raises the question of a link between crying and abuse.

2.3. CONCLUSION

Review of the literature on the prevalence and persistence of infant sleep disturbance reveals that it affects a sizable minority of children and that there is little evidence that sleep disturbance lessens over time. Given that it is such a common problem, a case could be made to define infant sleep disturbance as normal and not requiring intervention. Against this argument is the evidence reviewed above which shows clearly that sleep disturbance can impact adversely on both the child and his or her family. Furthermore, it is in many cases indeed perceived as a problem by the infant's parents as well as by professionals who may be in direct contact with the families concerned.

CHAPTER THREE

CAUSAL EXPLANATIONS

3.1. INTRODUCTION

It is difficult to describe and integrate this area of the literature because of its lack of clear direction, the generally poor quality of theoretical attempts at explaining infant sleep disturbance, and the lack of cohesion between theoretical approaches and applied research. In addition, there are many methodological weaknesses in the applied studies, these weaknesses are analysed in detail in Section 3.4 below.

The following quotations from two oft-cited studies investigating infant sleep disturbance demonstrate the lack of progress in the area over many years

> "Indeed the interaction of these numerous factors is so complex that it is seldom possible to say definitely that a given child's failure to sleep is due to one particular cause."(Moore and Ucko ,1957, p341)

> "This study can only suggest possibilities for future research in disentangling the causal relations in sleep disorders. As suggested previously, it is likely that a number of factors contribute to a child's sleeping problem." (Richman ,1981a, p289)

This lack of progress has resulted in a lack of direction in the research which can be seen in the contradictory nature of conclusions evident in even the most current research. Holliday et al. (1987) and Kataria et al. (1987) both consider variables associated with infant sleep disturbance but reach opposite conclusions. Holliday et al. emphasizes the probable role of neurological factors and Kataria et

al. lays stress upon environmental factors. In neither case is there a clear basis for their conclusions.

The theoretical approaches to understanding causal factors in the infant sleep disturbance literature are reviewed below. Although some of these, such as those considering developmental and physiological factors, are well conceptualized and have lead to well-executed research, the remainder appear to be based on opinion and speculation, often contradictory and have not lead to any attempt at integration.

In addition to theoretical papers speculating on the causes of sleep disturbance there are papers looking at associations between sleep disturbance and a multitude of variables. There is little connection between these areas of literature. The associated factors literature, in particular, has not attempted to clarify theoretical positions. The lack of experimental manipulation of variables and the absence of a conceptual framework means these studies make no statement regarding cause and effect. It is also rare for directions for future research to be given. One example is the literature which has examined whether parental response and infant sleep disturbance have a causal relationship. Until the development of behavioural studies coincident with the research presented in this thesis, attempts to consider this question have been based on opinion, have failed to specify mechanisms by which this influence is thought to happen, have failed to set hypotheses which could lead to fruitful research, or have failed to take existing knowledge about parent/child relationships into account.

3.2. THEORIES OF INFANT SLEEP DISTURBANCE

3.2.1. Psychodynamic Theories:

Separation anxiety is a common theme in psychodynamic writing dealing with infant sleep disturbance. It has appeared over a large span of years, having been used as an explanation by Daws (1985), Eggers (1982), Herzog (1980), who referred specifically to separation from the father, Hirschberg (1957), Nagera (1966) and also by Friend (1956) who included it as one of the several mechanisms outlined by the panel he cites in his paper. Most of these studies stress that the mother's difficulty separating from her child, stemming from her own childhood experiences, is as important as the infant's difficulty separating from his or her mother. Friend's (1956) paper, however cites a study presented by Neubauer, who reports a failure to find an increased frequency of sleep disturbance in children with clear separation anxieties. Other members of the same symposium claim an association between separation anxiety, stranger anxiety and infant sleep disturbance but stress that it is not a pathological process but a healthy sign of the normal development of object relationships.

The concept, of sleep disturbance being related to a difficulty in the mother's ability to separate from her infant, is consistent with some behavioural explanations of infant sleep disturbance which describe sleep disturbance behaviours as coming under the control of parental attention which then reinforces them. One of Daws (1985) solutions (insisting a child stay in bed and rewarding him or her for compliance) is surprisingly similar to some behavioural approaches such as those described by Seymour, Bayfield et al. (1983)

As well as citing separation anxiety as an explanation Eggers (1982) sees sleep disturbance as a by-product of the normal development of independence, exploration, imitation and play. Conflicts arising from

feeding and toilet training are mentioned by several authors (Daws, 1985; Eggars, 1982; Hirshberg, 1957; Friend, 1956; Nagera, 1966), as is hostility directed either from the mother towards the child or from the child to the mother (Hirschberg, 1957).

A variety of other explanations have been offered as well. Daws (1985) suggests the non-resolution of the child's oedipal feelings. Hirschberg's article includes mention of a narcissistic problem in parents, touched off by the infant and resulting in negative reactions blocking the mutual gratification of needs. Delegates at the symposium described by Friend (1956) covered other explanations such as: handling problems, ranging from insufficient handling to overstimulation, the infants fear of temporary regression resulting in loss of newly acquired ego functions, conflicts between active and passive tendencies in 2 year olds, anxiety that the body may disintegrate during sleep, and a clash between infant rhythms and maternal needs exacerbated by the modern medical imposition of fixed regimes. This, coupled with the advent of self demand feeding was purported to have led to mothers who have become uncertain and have lost their healthy "regulating function". Nagera outlines many factors which he considers important in triggering sleep disturbance, these are: changes in the environment, disturbed marital relationship, or a new pregnancy. He believes that these do not impinge directly on the infant but impact on the mother and thus on her relationship with her child.

Unfortunately these theories have not lead to empirical research and what little support there is, is frequently contradictory. The study by Neubauer, described by Friend (1956), for example, failed to find an expected relationship with separation anxiety. There are however some studies which support a relationship between life events and infant sleep disturbance (Ferguson et al., 1981; Kataria et al., 1987; Van Tassel, 1985).

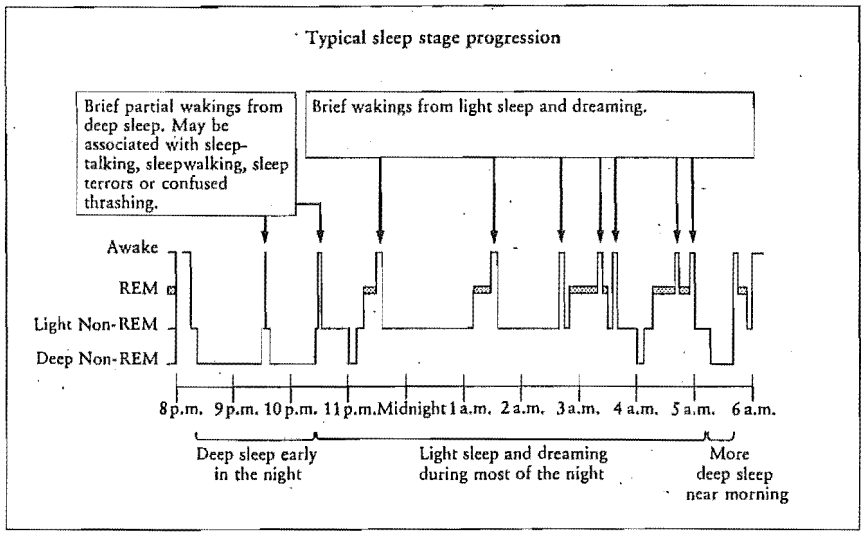
3.2.2. Theories Relating Infant Sleep Disturbance to the Development of Normal Infant Sleep:

Anders, et al. (1980) assert that the sleep/wake disturbances of various developmental stages may be related to the ontogenetic changes characteristic for that age. In an article which considers children and adolescents as well as infants they suggest that sleep disturbances of infancy may simply reflect disruptions in the temporal organization of REM-NREM states during sleep and the establishment of stable ultradian (i.e. shorter than one day) REM-NREM cycles. Anders et al. (1980) consider that environmental stress and maturation may both play a part in this process. They cite studies showing that the sleep of young babies is affected by changes in stimuli such as those found in a laboratory, to demonstrate that the sleep of even very young infants is more vulnerable to external stimulation than was previously thought. Maturational factors are important too. Anders et al. (1980) point out that although 78 % of 9 month old infants may satisfy maternal criteria of sleeping through the night their previous research demonstrated that 66% of 9 month old infants in fact wake in association with REM arousals during the night. These "simple" (Anders, 1979) arousals are not detected by parents unless the infant calls or otherwise draws his or her parents' attention to them.

Figure 1.

Typical sleep stage progression

(adapted from Ferber(1985b) p 31).



Ferber (1985b) describes sleep disturbances in children as resulting from arousals during the sleep cycle. In older children, these arousals are partial awakenings occurring during deep sleep early in the night. These arousals result in phenomena such as sleep-talking, sleep-walking and sleep terrors which are common in older preschoolers and school age children (see Figure 1). Ferber (1985a, b) describes the tendency of infants, on falling asleep, to descend rapidly to stage 4 NREM sleep from which they are difficult to arouse. A further period of deep sleep occurs prior to waking. The intervening period is characterized by cycling between REM and NREM sleep. Ferber (1985a, citing Anders, 1979) describes how infants experience arousals after each sleep cycle. He suggests that although many of these arousals are sufficiently brief that the infant returns to sleep without any awareness of being awake, other arousals may be more prolonged, the child may wake more fully, enough to realize that conditions are not "right"and he cannot get back to sleep (see Figure 1). Ferber stresses that these awakenings are normal and that the problem is not that the child wakes but that he or she is unable to initiate sleep without the conditions he or she normally associates with falling asleep.

> " So when a parent complains that their(sic) child is waking at night, they are usually incorrect in identifying the true problem. The problem is that the child in not returning to sleep, promptly and on his own, after waking normally. The reason: because when he wakes he is alone and in the crib, conditions with which he has not associated falling asleep." (Ferber,1 985a p. 229)

In referring to the concept of "associations" (Ferber 1985a, b) and the concept of "environmental stress" (Anders et al., 1980), both Ferber and Anders intimate that a developmental theory is not sufficient to explain the phenomenon of infant sleep disturbance but the mechanism by which environmental aspects may play a part is not

elaborated on. The manner in which environmental stresses exacerbate infant sleep disturbance and the role of infant learning outside of the development of associations is not addressed.

3.2.3. Behavioural Theories:

Ever since Williams (1959), behavioural principles have been used to explain and manage infant sleep disturbance. In general, however, behavioural approaches to infant sleep disturbance have been pragmatic rather than theoretical. Many authors offering advice on the management of infant sleep disturbance have intimated a behavioural explanation by describing training (Illingworth 1968), the need for reconditioning (Bax 1980) and using the concept of a Pavlovian conditioned reflex (without further explanation) to describe night waking (Wilks, 1977). Other authors have advocated management strategies based on behavioural concepts. Paul (1982), for example, describes a management technique utilizing a gradual reduction of attention, food and lying with the baby, and also mentions cuing by using the same toy or bedtime routine to help settle the child. Valman (1981) suggests gradually or abruptly withdrawing attention for crying and calls this "reconditioning." Schmitt (1981) advocates the use of gradual reduction of feeding for "trained night feeders" and leaving "trained night criers" to "cry it out". Ferber (1985b) describes the importance of assisting infants to form appropriate associations with falling asleep and the role of learning in overcoming night waking. He advises parents of management procedures based on these concepts. Other, outcome, studies are based on behavioural principles (Bidder et al., 1986; Johnson et al., 1981; Jones & Verduyn, 1983; McGarr & Hovell, 1980; Rickert & Johnson, 1988; Richman et al., 1985; Rolider & Van Houten, 1984; Seymour, 1987; Seymour, Bayfield et al. 1983; Weissbluth, 1982). Two

studies which attempt a coherent behavioural explanation are Seymour, Bayfield et al., (1983) and Richman et al. (1985).

Seymour, Bayfield et al. (1983) provide a "learning analysis" of sleep disturbance in young children. They state that in the sleep disturbed young child, falling to sleep is associated with the parent's presence or absence rather than the temporal stimulus of a regular bedtime and setting stimuli of the child's bed, bedroom, cuddly toys and blankets. They further state that parental attention and feeding of the child have a role in reinforcing not settling and inappropriate waking.

Richman et al. (1985) include a behavioural explanation in the hypotheses they formulated. They hypothesized that sleep problems in young children are not due to children needing little sleep, nor to anxiety or lack of parental attention but, rather, that parents inadvertently maintain the habitual sleep pattern by their responses, which act as positive reinforcers to not settling or to waking and crying in the night. They conclude after their study that their findings supported these hypotheses.

Behavioural accounts explain infant sleep disturbance in part. In particular they explain the manner in which sleep disturbance may be maintained by parents but they do not explain the origin of the sleep disturbance. Are sleep disturbed children merely prevented from settling to a stable sleep pattern by parental attention? Is the topography of sleep disturbance in infants who have never settled to a stable sleep pattern different from that of children who acquire sleep disturbance later in infancy? Behavioural explanations also fail to address the possible role of infant temperament and developmental changes in sleep state organization which occur, in particular, over the first year.

3.3. ASSOCIATED FACTORS

The studies investigating factors associated with infant sleep disturbance can be divided into the following types: (a) those considering variables intrinsic to the child, (b) those considering interactions between the parents and the child, (c) studies regarding factors intrinsic to the parents and (c) those investigating relationships between infant sleep disturbance and environmental factors. These studies are summarized within these areas in Tables 3, 4, 5 and 6. Given the lack of knowledge regarding some of these factors, their assignment to a various tables may be challenged. It could be argued, for example, that difficulty feeding is better categorized as being intrinsic to the child rather than as a function of the parent/child interface, however, in order to summarize an unwieldy area some, possibly arbitrary, decisions have been made.

3.3.1. Variables Intrinsic to the Child:

The results of studies which have investigated these variables are summarized in Table 3.

3.3.1.1. Other aspects of infant sleep:

Infants with sleep disturbance sleep less overall (Ferguson et al., 1982; Holliday et al., 1987; Moore & Ucko, 1957). The myth that too much sleep during the day leads to disturbed sleep at night has also been dispelled (Holliday et al., 1987). Sleep disturbed infants are likely to have had a history of sleep disturbance (Bernal, 1973; Blurton-Jones et al., 1978; Chavin & Tinson, 1980; Holliday et al., 1987; Kataria et al., 1987; Moore & Ucko, 1957; Ragins & Schachter, 1971), although Van Tassel (1985) failed to find a relationship between sleep disturbance in the first and second years.

Table 3. Individual factors associated with infant sleep disturbance

AUTHORS	TOTAL SLEEP TIME	EARLY SLEEP PROBLEMS	GENDER	ILLNESS COLIC	TEMPER-AMENT/ ACTIVITY	PERI-NATAL EVENTS	DEVELOP MENTAL SCORES	BEHAV-IOUR PROBLEMS	BIRTH ORDER	GENETIC/ CONSTIT-IONAL
Abe & Shimakawa (1966)										Positive correlation
Basler Largo & Molinari (1980)			Boys woke more							
Bernal (1973)		Positive correlation	No association		Several measures associated	Positive correlation			No association	Positive correlation
Blurton-Jones, Rosseti-Ferreira Farquar-Brown (1978)		Positive correlation			Positive correlation activity scores	Positive correlation	No association			
Campbell (1981)			No association			No association prematurity			No association	
Cary (1974) (1975)			No association		Some measures associated					

Table 3. continued

AUTHORS	TOTAL SLEEP TIME	EARLY SLEEP PROBLEM	GENDER	ILLNESS/ COLIC	TEMPER-AMENT/ ACTIVITY	PERI-NATAL EVENTS	DEVELOP-MENTAL SCORES	BEHAV-IOUR PROBLEMS	BIRTH ORDER	GENETIC/ CONSTIT-IONAL
Chavin & Tinson (1980)		Positive correlation		Positive correlation (both)		No association	No association		No association	
Ferguson, Shannon & Horwood (1980)	Negative correlation			No association	Positive correlation 3 month activity score	No association			1st born more waking	
Hart, Bax & Jenkins (1984)				Positive correlation						
Hauri & Olmstead (1980)										Positive correlation
Holliday, Sibbald & Tooley (1987)	Negative correlation	Positive correlation	Boys woke more	Negative correlation					No association	
Kataria, Swanson & Trevathan (1987)		Positive correlation	No association	Positive correlation			Positive correlation			

Table 3. continued

AUTHORS	TOTAL SLEEP TIME	EARLY SLEEP PROBLEM	GENDER	ILLNESS/ COLIC	TEMPER-AMENT/ ACTIVITY	PERI-NATAL EVENTS	DEVELOP-MENTAL SCORES	BEHAV-IOUR PROBLEMS	BIRTH ORDER	GENETIC/ CONSTIT-IONAL
Moore & Ucko (1957)	Negative correlation	Positive correlation	Boys woke	Positive correlation	No association,	Positive correlation	No association		1st born more waking	
Ragins & Schacter (1971)		Positive correlation	No association	No association	Some retrospective association		No association		No association	
Richman (1981a)			No association	Positive correlation (accidents)	Some measures associated	Positive correlation	Negative correlation	Positive correlation	1st born more waking	
Ungerer, Sigman, Beckwith, Cohen & Parmelee (1983)				Negative correlation illness 9 months			Positive correlation I.Q. age 5 years			No association
Van Tassel (1985)		No association	Boys more problems		Some measures associated		No association			
Werry & Carlielle (1983)			Girls woke more							
Zuckerman Stevenson & Bailey (1987)			No association	No association				Positive correlation		

3.3.1.2. Birth order:

Sleep disturbed infants have a tendency to be first born (Ferguson et al., 1982; Moore & Ucko, 1957; Richman, 1981a) although Bernal (1973) does not support this finding.

3.3.1.3. Colic:

Only one study (Chavin & Tinson, 1980) has investigated colic, in association with infant sleep disturbance. Sleep-disturbed infants are more likely to have had colic.

3.3.1.4. Illness:

Some studies (Chavin & Tinson, 1980; Hart, Bax & Jenkins, 1984; Kataria et al., 1987; Moore & Ucko, 1957; Richman, 1981a) report an association with previous illness occurring after the age of three months although this relationship is not clear. Ungerer, Sigman, Beckwith, Cohen and Parmelee (1983) describe a negative correlation between illness and sleep disturbance and Ferguson et al. (1981) Holliday et al. (1987), Ragins and Schachter (1971) and Zukerman et al. (1987) failed to find any relationship at all between illness and infant sleep disturbance. Holliday et al's (1987) study differentiates between an illness which may have precipitated sleep disturbance (claimed by many of the parents in that study) and a history of ill health generally (which was not reported by the parents in that study). It is likely that although an illness may precipitate sleep disturbance in some cases, the sleep disturbed child does not necessarily have poor health compared with his or her peers who are not sleep disturbed.

3.3.1.5. Gender:

Similar controversial results have been found in the case of gender. Basler et al. (1980), Holliday et al. (1987), Moore and Ucko (1957), and Van Tassel (1985) found that boys woke more than girls although in

Holliday's (1987) study the sexes were equally represented in the problem and non problem groups overall. Bernal (1973), Campbell (1981), Carey (1974), Kataria et al. (1987), Ragins and Schachter (1971), Richman (1981a) and Werry and Carlielle (1982), failed to find this difference between the sexes.

3.3.1.6. Perinatal events:

The role of perinatal events remains unclear despite many studies investigating it Bernal (1973), Blurton-Jones et al. (1978), Moore and Ucko (1957), and Richman (1981a) found an association between perinatal adversity and infant sleep disturbance whereas Campbell (1981), Chavin and Tinson(1980) and Ferguson et al. (1981) found no association between perinatal adversity and infant sleep disturbance.

3.3.1.7. Infant's overall development:

There is no evidence that infant sleep disturbance is related to problems in the infant's overall development (Blurton-Jones et al., 1978; Chavin & Tinson, 1980; Moore & Ucko, 1957; Richman, 1981a; Ragins & Schachter, 1971). Ungerer et al., found, in fact, that infants who had been sleep disturbed had slightly higher I.Q.s at age five than those who were not sleep disturbed.

3.3.1.8. Temperament and infant characteristics:

One consistent result is the association of infant sleep disturbance with infant characteristics such as temperament, activity scores and early crying. All studies investigating this have found associations with at least some of the variables measured. In the one exception, Moore and Ucko (1957) dismissed their own negative findings regarding child characteristics on the basis that the ratings were made in a situation which may not have revealed the child as he or she really was. They discounted their failure to discover differences

because of concerns that the measures of behaviour and activity made during short visits to their centre may not be reliable indices of the child's natural behaviour.

A variety of measures has been included under this category, unfortunately with little attempt to co-ordinate between studies. Van Tassel (1985) found that sleep disturbed babies differed from others in adaptability and mood. Richman (1981a) found differences in malleability and rhythmicity scores and a measure of irritability at 0-12 weeks. Ferguson et al. (1982), and Blurton-Jones et al. (1978) found differences in retrospective activity scores, and Carey (1974, 1975) in low sensory threshold, Crying was found to differ between the sleep disturbed and non-sleep disturbed groups in Ragins and Schachter (1971) and in Bernal (1973).

3.3.1.9. Neurological signs:

Hauri and Olmstead (1980) found that adult insomniacs who had been insomniac as children had several soft neurological signs and used this, along with citations of some temperamental and physiological evidence to conclude that insomnia beginning in childhood may have a neurophysiological/neurochemical, rather than a psychological base. They did not, however, furnish evidence regarding what proportion of sleep disturbed children might continue this disturbance into adulthood. Nor did they specify the age of childhood onset to clarify whether they included onset in infancy although their citation of two papers on infant sleep implies that this age group is included. The relevance of this paper to this research is unclear, but Bernal (1973) found differences between sleep disturbed and non-sleep disturbed infants on several neurological measures.

3.3.1.10. Genetic component:

The question of a genetic component in infant sleep disturbance has been very poorly investigated. Abe and Shimakawa (1966) found that children who manifested insomnia at three years of age had parents whose grandparents retrospectively recalled similar sleep disturbance in the parents as children. They use this information to conclude a genetic/constitutional component. Richman (1981a) failed to find an increased likelihood of childhood sleep disturbance in the retrospective recollections of parents of sleep disturbed two year olds but it is unclear whether she would have attributed such findings to genetic rather than other factors.

3.3.2. Factors Occurring Between the Parents and the Child:

The results of studies which have considered these factors are summarized in Table 4.

3.3.2.1. Parent management

Despite the difficulties in interpretation of this area (see below) there is evidence that parental handling has a role to play in the maintenance, if not the initiation of infant sleep disturbance. There are indications from individual studies that parents of sleep disturbed children may choose different approaches to management of waking from those of non-disturbed children (Holliday et al., 1987; Campbell, 1981). Sleep disturbed children are more likely to be taken to their parent's bed on awakening (Holliday et al., 1987; Kataria et al., 1987; Richman, 1981a; Van Tassel, 1985) and to be fed during the night (Moore & Ucko, 1957; Van Tassel, 1985). Blurton Jones et al. (1978), however, tabulate many different approaches but conclude that there are no convincing differences in interventions between parents of wakers and non-wakers but that parents of sleep disturbed infants use a greater variety of management techniques with them.

Table 4. Factors associated with infant sleep disturbance occuring between parents and child

AUTHORS	PARENTAL HANDLING	PARENTS' BED	DIFFICULTY FEEDING	BREAST FEEDING	FEEDING ROUTINES	DAYTIME HANDLING
Bernal (1973)					No association with night feeds Positive correlation with frequency of feeding 1st 10 days	No association
Blurton-Jones, Ferreira, Farquar-Brown & Mcdonald (1978)	No association with type of approach Positive correlation with number of approaches	No association		No association		Mothers of wakers pick up crying infants more rapidly
Campbell (1981)	Positive correlation with "traditional" bed-time technique					
Chavin & Tinson (1980)				No association		

Table 4. continued

AUTHORS	PARENTAL HANDLING	PARENTS' BED	DIFFICULTY FEEDING	BREAST FEEDING	FEEDING ROUTINES	DAYTIME HANDLING
Holliday, Sibbald & Tooley (1987)	Positive correlation with story on settling Negative correlation with cuddles on awakening	Positive correlation				
Kataria, Swanson & Trevathan (1987)		Positive correlation				
Moore & Ucko (1957)	Positive correlation with variable handling		Positive correlation	No association	No association with routine night fed babies woke more	Negative correlation with "optimum" nursing time
Richman (1981a)		Positive correlation			Positive correlation	

Table 4. continued

AUTHORS	PARENTAL HANDLING	PARENTS' BED	DIFFICULTY FEEDING	BREAST FEEDING	FEEDING ROUTINES	DAYTIME HANDLING
Ungerer, Sigman, Beckwith, Cohen & Parmelee (1983)						Positive correlation with positive social interactions with care-giver < 2yrs
Van Tassel (1985)	Positive correlation with "curtain calls"	Positive correlation		Positive correlation	Positive correlation with night feeds	
Wright, Mcleod & Cooper (1983)				Positive correlation		
Zuckerman, Stevenson, & Bailey (1987)				Positive correlation		

That parents of sleep disturbed infants use a greater variety of sleep management techniques is also supported by Moore and Ucko (1957) and leads to the suggestion that parents of sleep-disturbed infants are less consistent and predictable in managing their babies at night.

There also appears to be some evidence that sleep disturbed babies may be responded to more intensively during the day, (Blurton-Jones et al., 1978; Ungerer et al., 1983) but Moore and Ucko (1957) found sub-optimal handling at feed time to be implicated as well.

3.3.2.2. Feeding regimes:

One study (Moore & Ucko 1957) found a relationship between infant sleep disturbance and early feeding difficulties, but feeding routines in general have not been implicated (Bernal, 1973; Moore & Ucko,1957)

The role of breast feeding is controversial. Carey (1975), Van Tassel (1985), Wright, McCleod and Cooper (1983) and Zuckerman et al. (1987) found an association between infant sleep disturbance and breast feeding, whereas, Chavin and Tinson (1980) Blurton-Jones et al. (1978) and Moore and Ucko (1957) found no association.

3.3.3. Factors Intrinsic to the Parents:

The results of studies considering these variables are summarized in Table 5.

3.3.3.1. Demographic variables

There is no evidence that parents' social class (Campbell, 1981; Ferguson et al., 1982; Holliday, 1987; Kataria et al., 1987; Richman, 1981a; Wright et al., 1983), age (Campbell, 1981; Ferguson et al., 1982; Holliday et al., 1987; Kataria et al., 1987; Richman, 1981a), has any bearing on infant sleep disturbance, except where contradictory

associations have been found by Van Tassel (1985), who found lower socioeconomic levels to be associated with higher levels of sleep disturbance and Ungerer et al. (1983) who found higher levels of infant sleep disturbance in families from higher socioeconomic levels. Parents' race has been found to have no association with infant sleep disturbance by Campbell (1981), Ferguson (1981) and Kataria (1987), but Zuckerman et al. (1987) found an increased rate of sleep disturbance in the infants of West Indian and African mothers.

3.3.3.2. Maternal employment:

Two studies (Campbell, 1981; Van Tassel,1985) have found a relationship between maternal employment and infant sleep disturbance although this relationship was not found by Kataria et al. (1987) or Zuckerman et al. (1987). Van Tassel (1985), who also found this variable to be related to maternal concern regarding the infant's sleep disturbance, suggests that this relationship may be better explained by the concept of maternal absence and that mothers away from their infant during the day may find night-time separations particularly difficult.

Table 5. Factors intrinsic to the parents

AUTHOR	S.E.S. LEVEL	AGE	RACE	MATERNAL EMPLOYMENT	FAMILY SLEEP	MATERNAL DEPRESSION
Campbell (1981)	No association	No association	No association	Positive correlation		
Chavin & Tinson (1980)		No association				
Ferguson Shannon & Horwood (1982)	No association	No association	No association			
Holliday, Sibbald & Tooley (1987)	No association	No association				
Kataria Swanson & Trevathan (1987)	No association	No association				
Moore & Ucko (1957)	No association					
Pritchard & Appleton (1988)						Positive association
Ragins & Schachter (1971)	No association					

Table 5. continued

AUTHOR	S.E.S. LEVEL	AGE	RACE	MATERNAL EMPLOYMENT	FAMILY SLEEP	MATERNAL DEPRESSION
Richman (1981a)	No association				Positive correlation (siblings) Negative correlation (parents retrospective)	Positive correlation
Ungerer, Sigman, Beckwith, Cohen & Parmelee (1983)	Positive correlation				Negative correlation (father)	
Van Tassel (1985)	Negative correlation			Positive correlation	Positive correlation (mother)	Positive correlation
Werry & Carlielle (1983)						No association
Wright, Mcleod & Cooper (1983)	No association					
Zuckerman Stevenson, & Bailey (1987)	No association	No association	Positive correlation West Indian or African	No association		Positive correlation

3.3.3.3. Parental sleep disturbance:

The presence of parental sleep disturbance was related in a complicated manner by Van Tassel (1985) who reported that infant sleep disturbance was associated with greater sleep disturbance in the mother but with less sleep disturbance in the father. This may of course be because the mother's sleep is disturbed by the infant. The question of parental sleep disturbance has not been posed in other studies but Richman (1981a) failed to find an increased incidence of childhood sleep disorders from the retrospective accounts of parents of sleep disturbed infants.

3.3.3.4. Maternal depression or malaise:

The question of maternal depression or malaise has been considered in four studies with a clear relationship with infant sleep disturbance being found in three of them (Richman, 1981a; Van Tassel, 1985, Zuckerman et al., 1987). A relationship was not found by Werry and Carlielle (1983) who qualified their lack of findings, however, by describing a very high rate of depressive symptomatology amongst their sample of mothers of infants and pre-schoolers overall, regardless of their children's sleep patterns.

Zuckerman et al. (1987) further investigated the relationship between maternal depression and infant sleep disturbance by measuring the prevalence of depressive symptomatology in a sub-group of mothers whose children had persistent sleep problems at age three. The sub-group of mothers they followed had children who had been sleep disturbed at 8 months of age but these mothers, at that point had failed to show any depressive symptomatology. These mothers failed to show an increased rate of depressive symptomatology over time and Zuckerman et al. (1987) concluded that the depressive symptomatology demonstrated by the other mothers of

sleep disturbed infants was not caused by their infant's sleep disturbance.

3.3.4. Environmental Factors:

The results of studies investigating this area are summarized in Table 6.

3.3.4.1. Housing:

Studies investigating this area have found no relationship between sleep disturbance and type of housing (Holliday et al., 1987; Ferguson et al., 1982; Campbell, 1981; Richman, 1981a; Chavin & Tinson, 1980). Zuckerman et al. (1987) found no relationship between infant sleep disturbance and overcrowding.

3.3.4.2. Family support:

Two studies to investigate whether the availability of support (from friends and relatives for example) was associated in any way with infant sleep disturbance (Werry & Carlielle, 1982; Zuckerman, 1987). No relationship was found.

3.3.4.3. Sleeping arrangements:

Sleeping in a room alone or with other children has no association with sleep disturbance (Ragins & Schachter, 1971; Moore and Ucko, 1957) although Campbell (1981) reports that the more traditional method of children sharing rooms with siblings is advantageous in that it leads to less sleep disturbance.

3.3.4.4. Family composition:

Family size per se is not associated with infant sleep disturbance (Campbell, 1981; Ferguson et al., 1981; Holliday et al., 1987), however, the presence of twin or tripling siblings is (Ferguson et al., 1982).

Table 6.
Environmental factors associated with infant sleep disturbance

AUTHORS	SLEEPING ALONE	N.SIBS/ PARENTS	LIFE EVENTS	FAMILY SUPPORT	FAVOURITE OBJECT	HOUSING
Campbell (1981)	Positive correlation	No association siblings or parents				No association
Chavin & Tinson (1980) association						No
Ferguson, Shannon & Horwood (1982)		Positive correlation with twin No association with N. of parents	Positive correlation			No association
Holliday, Sibbald & Tooley (1987)		No association siblings or parents	No association		Negative correlation (transitional object)	No association
Kataria, Swanson & Trevathan (1987)			Positive correlation			
Moore & Ucko (1957)	No association					
Ragins & Schachter (1971)	No association		No association			
Richman (1981a)			Positive correlation		Positive correlation (pacifier)	No association
Van Tassel, (1985)			Positive correlation			
Werry & Carlielle (1983)				No association		
Zuckerman Stevenson & Bailey (1987)				No association		No association

3.3.4.5. Life events:

Most studies investigating life events or other family stressors have found a positive relationship with infant sleep disturbance (Ferguson et al., 1982; Kataria et al., 1987; Richman, 1981a; Van Tassel 1985), although Holliday et al. (1987) and Ragins and Schachter (1971) failed to find such a relationship.

3.3.4.6. Transitional object:

Taking a favourite object to bed appears to be related to sleep disturbance but this clearly needs more investigation as the relationships are unclear. Holliday et al. (1987) found that children who slept with a transitional object were less likely to have sleep disturbance whereas Richman (1981a) found that sucking a pacifier was positively associated with sleep disturbance.

3.3.5. Other Relevant but Peripheral Research:

There are a few studies which are relevant to this section which considers factors associated with infant sleep disturbance but which do not follow the format of correlating possible variables with the presence or absence of infant sleep disturbance. These include papers considering at-risk groups for sleep disturbance, papers considering influences on earlier development of sleep patterns without investigating directly their implications for the development of sleep disturbance after six months of age, and conceptually relevant papers whose measures of sleep disturbance are not directly comparable to those included in this research.

3.3.5.1. At-risk groups:

Groups which may be at risk for developing infant sleep disturbance have been considered by Kaplan, McNicol, Conte and

Moghadam (1987) who found a greater amount of sleep disturbance in children meeting the D.S.M. III criteria for attention deficit disorder with hyperactivity than in children without the disorder but do not present any theoretical perspective to help explain this. Another study considering at risk groups is Muratorio, et al. (1984) who found an association between insomnia early in the first year of life and the diagnoses of organic and developmental disorders in children presenting to a neuropsychological clinic. Muratorio et al. (1984) interpret this phenomenon within a neurological perspective but do not specify their definition of early insomnia so the significance of their finding is difficult to evaluate.

3.3.5.2. Influences on the early development of sleep:

Gabriel, Grote and Jonas (1981) and Salzarulo, Fagioli and Salomon (1980) both investigate the impact of different care regimes on the organization of sleep states in neonates. Both these studies were of infants requiring intensive hospital care. They found that sleep states mature faster in infants who are under less disturbing care regimes (Gabriel et al., 1981) or continuous feeding (Salzarulo et al., 1980). Although the children in the samples had serious medical complications, making generalization difficult, some very interesting questions regarding the possible role of overstimulation in sleep disturbance can be raised and at the very least require further investigation.

3.3.5.3. Relevant research lacking directly comparable sleep measures:

Weissbluth and Liu (1983) investigated the association between attention span, temperament and infant sleep patterns. They found maleness, short attention span and temperament to be related to sleep in various ways but did not investigate any dimensions of sleep

disturbance as part of their research. Salzarulo and Chevalier (1983) looked at infant sleep disturbance and its association with later sleep disturbance in a much older group (up to 15 years). They found that older sleep disturbed children are more likely to have been sleep disturbed as babies.

3.4 METHODOLOGICAL CONSIDERATIONS

Problems within this area of literature divide into those of interpretation and those of execution.

3.4.1. Problems of Interpretation:

The lack of conceptual sophistication in this area results in studies stating the presence or absence of correlation between infant sleep disturbance and various factors but no advance in theoretical understanding of the processes involved. These deficiencies are apparent in the following ways:

3.4.1.1. Lack of Explanations:

There are few attempts to postulate explanations from well established theoretical perspectives for relationships found between sleep disturbance and various factors. Most of the studies cited (e.g., Bernal, 1973; Holliday et al., 1987; Kataria et al., 1987; Moore & Ucko, 1957; Richman, 1981; Van Tassel, 1985) consider a battery of possible associations but it is very difficult to interpret the significant associations found without a theoretical stance which is capable of leading to clear predictions regarding expected effects. For example significant findings such as the association between temperament and previous illnesses and infant sleep disturbance, are frequently found, but the causal role of genetic, physiological or behavioural factors in linking them is not considered. Even where these concepts are

introduced there is no plausible mechanism offered to explain the phenomenon or lead to fruitful further research. Hauri and Olmstead (1980) and Muratoria et al. (1984), for example, simply postulate a neurological explanation for their findings without describing this any further.

3.4.1.2. Lack of cause and effect relationships:

It is seldom that a cause/effect relationship can be stated in the type of research which has explored factors associated with infant sleep disturbance. Unless the measures were taken clearly before the onset of the sleep disturbance it is equally possible, given the research designs, that the associated factor was caused by the sleep disturbance as the other way around. Parental behaviour and maternal depression, for example, are as likely to be determined by the sleep disturbance as to determine it.

Even should an associated variable be shown to precede the sleep disturbance the possibility of intervening variables is seldom considered. It is possible, for example, that parental behaviour is affected by the infant's temperament and that this affects the sleep disturbance in turn. Similarly Moore and Ucko's finding of the association of "optimum" nursing time with more settled sleep in infants and their explanation of this as a function of contact may have been a confounding of variables. The possibility that the sleep disturbance of babies nursing less and babies nursing more could have functionally different explanations has not been considered. If the mechanisms by which these phenomena may occur are postulated, more fruitful research may result.

3.4.1.3. Conceptual errors in research:

The absence of conceptual clarity in these studies has frequently meant that the effort expended to answer important questions has

been wasted. One question that comes up time and again is that of the role of parental behaviour in infant sleep disturbance. Studies investigating this question (Blurton-Jones et al., 1978; Campbell, 1981; Holliday et al., 1987; Moore and Ucko, 1957) have looked at a variety of management techniques for infant sleep disturbance and compared either groups with sleep disturbance behaviours or identified as presenting a sleep-disturbance problem with those who do not. Many basic behavioural concepts were overlooked:

1. One error is for authors to assume more continuity in child rearing practises than there has in fact been. Methods which are used at the present time may not have been used in the past. Also, contingencies operating on parent and child are very likely to be different in sleep disturbed, compared with non-sleep disturbed children. Bernal (1973), for example, neglects to address either of these points in that he bases his consideration of differences in parental management on two diary nights with no consideration of prior management attempts. Other studies, for example, Blurton-Jones et al. (1978) do ask about approaches tried in the past but do not carry out the necessary further step of comparing the execution and outcome of these methods between the groups.

2. The one positive finding evident in this area of literature, namely, that parents of sleep disturbed children use more approaches to sleep management than parents of non-sleep disturbed infants, is not conceptually explored in the literature. It could be evidence of the impact that an intermittent reinforcement schedule has on the child but could also be evidence of the effect of ratio strain on parental behaviour. Some studies have asked parents whether they leave their child to cry, however, the information gained from this question is of limited usefulness in that what the conditions were under which this

occurred are not elicited. The behavioural impact of leaving a child consistently until he or she settles back to sleep alone is very different from leaving a child until the parent feels exhausted or guilty and then attends to the child.

3. The fact that parents of infants with sleep disturbance have a very different constellation of behaviours to deal with than parents whose children do not present in this way and that this in itself may influence management decisions has not been addressed in any study. Change in this area has been slow. Richman (1981a) does acknowledge the problem of the impact of child behaviour on parents. More recently the concept that parental behaviour may act to maintain rather than cause sleep disturbance has been addressed (Richman, 1981b) but this has not led to more rationally constructed research into the role of parents. In spite of this, specific conclusions regarding the role of parental behaviour have been drawn by Blurton-Jones et al. (1978) who state categorically that parents do not have a role in producing infant sleep disturbance.

3.4.1.4. Lack of attempts to clarify these questions:

It is unfortunate that simple approaches to clarify some of these questions have not been taken. In the case of parent management of infant sleep behaviour, for example, it would be comparatively straightforward to ask parents of children without sleep disturbance if they had intervened to prevent it in a systematic way. Do parents of sleep disturbed children have a different philosophy or belief about parenting which could determine their behaviour? Has this changed over time as a result of parenting their child? Such specific questions could be posed regarding the mechanisms of other variables too. Given the short period of time involved in the establishment of infant sleep disturbance it is quite possible to carry out prospective studies

which track these factors or, ideally, to investigate theoretical perspectives by manipulating variables in preventive studies.

3.4.2. Problems in Execution

Studies considering factors associated with sleep disturbance demonstrate serious problems in their execution.

3.4.2.1. Reliance on self report measures:

These studies rely on self report as the predominant means of information gathering and often this is retrospective (Abe & Shimakawa,1966; Holliday et al., 1987; Ragins & Schachter, 1971). The limitations of using recollections has been underlined by Holliday et al. (1987) who stated that parents recollections of the time their child spent in their bed varied according to the child's current age. It is also possible that parents' recollections would be affected by perceptions of the social desirability of their responses and by their perceptions of the researchers' expectations. Given that the management of infant sleep is contentious (see Chapter Five) and likely to be emotionally , this process is very likely to affect parental recollections. Some studies (Blurton-Jones, 1978; Carey,1974; Richman, 1981a) asked parents to rate their infants temperament or activity levels after sleep disturbance was established. The sleep disturbance itself may have affected parents' perceptions of their infant's temperament. The controversy regarding the role of parental attributions in determining infant temperament has been well aired elsewhere in the literature (Bates, 1983; Thomas, Chess & Korn, 1982) but has not been considered in studies relating temperament and infant sleep disturbance.

3.4.2.2. Lack of Standardized Measures:

It is difficult to compare studies in this area. Little attempt to use standard approaches to measurement of factors such as temperament, parental behaviour, other family sleep problems, or family stresses has been made. The use of Prechtal's Sub-Optimal Criteria (Richman, 1981a), Beck's Depression Inventory (Van Tassel, 1985), Rutter's Malaise Inventory (Werry & Carlielle, 1983) and the Cornell Medical Inventories' Malaise Scale (Richman, 1981a) in some studies is an exception, which may lead to more standardized approaches in the future. Moore and Ucko (1957) point out the drawbacks in using obstetric records to ascertain peri-natal status but subsequent studies have in some cases not even used these comparatively objective records, relying instead on interview of the mothers for this information (Chavin & Tinson, 1980; Van Tassel, 1985). Campbell (1981) addressed her questions regarding infant sleep and parental handling to child health nurses who presumably can only rely on hearsay information from the parents.

Further difficulties in comparison arise when studies use groups comprising very different types of children. Some studies (Blurton-Jones et al., 1978; Carey, 1974; Kataria et al., 1987; Moore & Ucko, 1957; Richman, 1981a; Van Tassel, 1987 and Wright et al., 1983) group children on the basis of their sleep behaviour, for example the extent of their night waking, others (e.g., Chavin & Tinson, 1980) group children on whether their sleep behaviour is experienced as a problem (i.e., the mother reports being worried about the night waking). Clearly the composition of the control groups in each of these studies is very different and one wonders how effectively questions about parental, perinatal or temperamental effects on infant sleep behaviour can be answered when many children in the control group

are exhibiting the same behaviours as the experimental group, as was the case in Chavin and Tinson's (1980) study.

3.4.2.3. Inadequate statistical techniques:

The importance of results that are presented is sometimes difficult to determine since they can be based on trends only or on percentages or other inadequate statistical techniques. Blurton-Jones et al. (1978) and Chavin and Tinson (1980), for example, present their respective results of neurological differences and differences in illness or other problems just on the basis of claimed differences between groups which are not further elaborated.

3.5. CONCLUSION

The two approaches to establishing causal relationships in the infant sleep disturbance literature are theoretical explanations and empirical studies which consider factors associated with infant sleep disturbance. There is very little cohesion between the two areas of literature. Clear relationships have been established between infant sleep disturbance and some variables such as infant temperament, some measures of parental handling and maternal depression but these associations have not been coherently explained in a manner which increases understanding of infant sleep disturbance or leads to further research. This, coupled with the methodological weaknesses evident in most studies has meant that there is still very little understanding of what causes infant sleep disturbance.

CHAPTER FOUR

THE MANAGEMENT OF INFANT SLEEP DISTURBANCE

4.1. PROFESSIONAL ADVICE:

The professional literature offers a wealth of advice on the management of infant sleep disturbance. This is written by doctors, nurses, and psychologists and is not based on empirical evidence other than the experience of the authors. Often this advice is contradictory, in that, for example, some authors advocate taking the child to the parents' bed as a solution (Bax, 1980) while others oppose this method (Spock, 1949; Lask ,1977). Similarly, some authors advocate leaving the child to cry every time the child awakens (Battle, 1970; Illingworth, 1968; Schmitt, 1981; Spock, 1949, 1957; Sumpter, 1975; Younger, 1972). Lask (1977), however, states that this approach should not be taken under any circumstances. Bax (1980) states that it is generally inadvisable. Jolly (1981) suggests that the child can occasionally be left to cry whereas Anderson (1951) differentiates hostile night crying from that based on separation anxiety and suggests that the former be treated by leaving the child to cry and giving verbal reprimands or spanking.

Ferber (1985b) presents many practical approaches to the management of infant sleep disturbance derived from his explanations of the phenomena. These include, forming appropriate associations with falling asleep such as darkness, quietness or a cot

rather than rocking, suckling and the television, and gradually reducing feeding and attention during the night.

Other suggestions within this area of literature include: spanking (Anderson, 1951; Wilks, 1977), staying with the child or games to overcome separation anxiety (Anderson, 1951; Sumpter, 1975), changing feeding regimes, supplying toys for use by the child during the night and providing a separate bedroom (Jolly, 1985), ensuring the child is not overstimulated (Paul, 1982), providing a predictable routine at bed-time (Ferber, 1985b; Paul, 1982) and the gradual reduction of parental attention or feeding (Paul, 1982; Valman,1981; Schmitt, 1981). The best which may be said about it is that this literature is a rich source of procedures for inclusion in systematic outcome studies.

4.2 MEDICATION:

The use of sedative medications with sleep disturbed infants is also controversial.

4.2.1. Advice Regarding the Use of Medication

Ferber and Revinus (1979), Jolly (1981) and Paul (1982) advise against the use of sedative medication for reasons which include risk of further problems (Ferber & Rivinus,1979), ineffectiveness and unacceptability to parents (Paul, 1982). Other authors advise its use (Anderson, 1951; Illingworth, 1968; Lask, 1977; Valman, 1981) but vary in the recommendations they make about drug type, dose and regime used.

4.2.2. Types of Medication Used:

The types of drugs suggested depends on the era of the paper, with Anderson (1951) suggesting the use of sodium bromide, phenobarbitol,

or other barbiturates. Illingworth (1968) suggests chloral hydrate while contemporary authors suggest the use of anticholinergic sedatives such as trimeprazine, or promethazine (Lask,1977; Valman, 1981).

4.2.3. Regimes Advocated

Lask (1977), Illingworth (1968) and Valman (1981) all suggest that drug management can be used to break the habit of waking, but vary in the regime they recommend. Lask (1977) suggests that this is best achieved by a fixed dose rate over two weeks, Illingworth (1968) suggests an increasing rate over one week and Valman (1981) suggests a decreasing rate over four weeks.

4.2.4. Prevalence of Use:

Despite controversy over whether to use such medication or not, sedatives are widely prescribed for infants (Chavin & Tinson, 1980; Werry & Carlielle, 1983). Werry and Carlielle (1983) found that medical practitioners usually managed pediatric sleep disturbance, the most common non-medical problem in infants, by prescribing sedative medication. As a consequence a third of New Zealand children are prescribed sedatives by age five. Similar figures are available for Australia (Moesbergen, 1987). However a widely cited figure of one in four children receiving medication by 18 months (Moesbergen, 1987; Richman, 1981a; Simonoff & Stores, 1987) could not be verified by reference to the original article (Ounsted & Hendrick, 1977). These reports, based on official records of medical prescriptions are severe underestimations of infant medication use as similar compounds are available without prescription. One Christchurch pharmacist (personal communication to K. G. France) reports more sold without prescription, than by prescription.

4.2.5. Studies Investigating the Use of Sedatives with Infants:

Although sedatives are widely used, there have been very few controlled studies into their effectiveness in the under two age group. Russo, Gururaj and Allen (1976) who investigated the use of diphenhydramine in two to twelve year olds was, for a long period, the only study at all. More recently, there have been two studies investigating the use of trimeprazine in infants and pre-schoolers (Richman, 1985; Simonoff & Stores, 1987). Richman (1985) investigated the use of trimeprazine tartrate (30-60mg in an increasing dose depending on response) in 22 children between the ages of 12 and 24 months. The medication was administered double-blind in a randomized sequence with each child receiving trimeprazine and placebo with a two week intervening period. Although there were significant changes in Sleep Behaviour Scale scores these changes were of limited extent and temporary in that all children had returned to baseline levels of sleep disturbance by 6 month follow-up. Simonoff and Stores (1987) used an increased average dose and duration of medication administration over that of Richman's (1985) study. They administered trimeprazine tartrate (45-90mg: 6mg/kg) and placebo to eighteen, 12 to 36 month old children using a double-blind cross-over design for four weeks with each administration of medication/placebo being followed by a 1 week washout period. They found that night waking decreased but was not eliminated and that there was no effect of the medication apparent at 1 month follow-up, results similar to Richman (1985).

These results substantiate the claims by other authors that medication is not effective with infant sleep disturbance in the long term (Chavin & Tinson, 1980; Jones & Verduyn, 1983; Paul, 1982; Richman et al., 1985; Seymour, 1987) and contradict the notion that drug use may break the waking habit (Lask,1977; Illingworth, 1968;

Valman 1981). The usefulness of medication, therefore, seems to be restricted to to short-term relief.

4.2.6. Disadvantages to the Use of Medication:

In addition to ineffectiveness there are other disadvantages to the use of medication. Parental resistance has been mentioned by Paul (1982) and found by Richman (1985) and Simonoff and Stores (1987) for whom approximately one third of the parents of potential subjects refused to administer medication to their children. There is very little known about the safety and psychotropic action of the compounds widely used to sedate children (Rappoport, Mikkelson & Werry, 1978; Werry, 1980). There is no literature on the effect of antihistamines such as trimeprazine, promethezine and diphenhydramine on sleep organization, such as REM sleep, although they are reported to have a slowing effect on the EEG and to block arousal (Werry, 1980). In animals, at higher phylogenetic levels, this effect changes, paradoxically, to produce seizure activity. There is no evidence cited as to whether or not this effect is apparent in human subjects (Werry 1980). Thus these compounds are widely used without knowledge of their effects and side-effects. In particular, given the probable role of REM sleep in infant sleep disturbance, the failure to consider this aspect of drug action is significant. There are also known disadvantages to the use of sedatives particularly in the long-term (Kales, Bixler, Tan, Scharf & Kales, 1974) such as drug-withdrawal insomnia and dependence.

The cost of sedatives is high. Moesbergen (1987) gives estimated prescription costs of child sleep sedatives to the New Zealand Health Department for the period April 1985- March 1986 as over half a million dollars, but these figures do not differentiate age or the use of these compounds as antihistamines or for upper-respiratory tract disorders. Nevertheless the cost is substantial and does not include the

cost of promethazine and similar sedatives which are available without prescription.

4.3. BEHAVIORAL TREATMENTS

There are several, predominantly single-subject, studies investigating behavioural approaches with older children with sleep disturbance either on its own (Anderson, 1979; Howlin, 1984; Kellerman, 1980; Milan, Mitchell, Berger & Pierson, 1981; Rappoff, Christopherson & Rappoff, 1982; Sanders, Bor & Dadds, 1984; Thomas & Smith, 1972; Yen, McIntyre & Berkowitz, 1972) or in conjunction with severe developmental problems (Wolf, Risley, & Mees, 1964; Wright, Woodcock & Scott, 1970). All suggest that behaviour management can be used to break the habit of waking. Studies with, or including, infants, however, have until recently been rare.

These studies rarely use just one technique and have been grouped according to the predominant technique used. A common component of many programmes has been to (re) structure pre-bedtime routines. In the analyses presented below, this is termed a "stimulus control" procedure, since it sets the occasion for subsequent sleep.

4.3.1. Studies Employing Scheduled Awakenings:

This technique involves pre-emptively awakening an infant prior to the usual time of awakening during the night. The periods of time between scheduled awakenings is gradually increased with the aim of establishing an undisturbed sleep period lasting the whole night. McGarr and Hovell (1980) report a case study in which a 3 month old girl's night waking was controlled using scheduled awakenings. The parents were instructed to awaken the child before her usual awakening time and feed and console her, before she cried. The

periods between scheduled awakenings were gradually increased until the child was sleeping an unbroken 7 hours at night and night crying was eliminated. Johnson et al. (1981) investigated McGarr and Hovell's (1980) technique experimentally by using a multiple baseline across subjects design with three, 9-12 month old infants. The procedure successfully eliminated spontaneous awakening in two of the children but the third was withdrawn by his/her parents in favour of an extinction approach. In a further paper, Rickert and Johnson (1988) experimentally compared scheduled awakenings with extinction (systematic ignoring) using a group design with thirty-three, 6 to 54 month old children. They found that children in the scheduled awakening group and in the systematic ignoring group both awoke and cried less often than children in their control group but that extinction was more rapid than scheduled awakening during the first week of intervention and that extinction was suited to managing the large number of children presenting with both delayed sleep onset and night waking (Bidder et al., 1986) whereas scheduled awakening was not.

4.3.2. Studies Employing Extinction:.

The first application of extinction to infant sleep disturbance was by Williams (1959) who reported a case study where bed-time tantrums were eliminated in a 21 month old boy. The parents were instructed to put the child to bed, leave the room and ignore the tantrums which occurred prior to settling. The tantrums reduced rapidly until the child settled without tantrums on the third night. Williams also reports an inadvertent reversal where a baby-sitter attended to the tantrums and the frequency increased. Moesbergen (1987) in an unpublished study used an extinction and stimulus control procedure in a multiple baseline across subjects design with 13 infants between the ages of 6-24 months. Parents were instructed to place their

children in bed after an agreed upon bed-time ritual. They were then instructed to refrain from attending to their child unless absolutely necessary. All cases showed decreases in the number of awakenings and improvements on a composite sleep scale based on Richman's (1981a, 1985) Sleep Behaviour Scale. These treatment gains were maintained in 10 of the 11 cases available for an 18 month follow-up. Rickert and Johnson (1988) used an extinction procedure, (as noted above in Section 4.3.1) in comparison with scheduled awakening concluding that extinction was more rapid and able to be used with children who had both delayed sleep onset and night waking.

4.3.3. Studies Employing Graduated Extinction:

4.3.3.1. Graduated extinction by increasing the criteria for response:

Rolider and Van Houten (1984) used a variation of an extinction procedure by requiring parents to gradually increase the criteria they were using to ignore bed-time crying. They took baseline measures of how long the parents of three children, 24 months and older, could ignore crying during the sleep onset delay period and then required them to increase the period of ignoring by 2 minutes a night. All children were able to successfully settle to sleep without bed-time crying by the end of the programme.

4.3.3.2. Graduated extinction by gradually eliminating reinforcers:

Lawton (1985) (Lawton, France and Blampied, 1989) used a graduated extinction procedure over six, 6-19 month old children with night waking, delayed sleep onset and bed-time delay. Parents' usual practices were measured and the amount of time spent attending to the child was systematically eliminated over 10 days. Four of the six subjects showed significant improvements which were maintained for four children at 2 month follow-up. An additional five subjects for

whom graduated extinction was not appropriate because they slept in their parents' beds were put through an extinction procedure. Lawton (1985) concluded that both procedures were effective but that extinction was more uniform and efficient. Graduated extinction did not invariably overcome the initial increase in responding associated with extinction but in some cases was more acceptable to parents.

4.3.4. Studies Employing Fading:

Jones and Verduyn (1983) report the outcome of management interventions with nineteen, 4 to 59 month old children. Intervention varied for each child but involved identifying the factors which reinforced the child's sleep problem. These were then gradually withdrawn or replaced with less potent "rewards" Leaving the child to cry was not suggested. At the end of intervention 90% of the children's sleep problems were resolved or showed partial resolution although the authors do not present the criteria they used in judging outcome.

Pritchard and Appelton (1988) used an intervention incorporating a fixed bed-time routine and minimal checking (once on awakening and at 20 minute intervals thereafter), with 31 children between the ages of 9 and 42 months. There were improvements in the average number of nights the children woke up and the number of times they were disturbed each night. An additional advantage of the intervention was improvements in the mothers' emotional state as the children's sleep improved.

4.3.5. Studies Employing the Use of a Fixed Routine:

Weissbluth (1982) successfully intervened with a 7 month old girl who had severe sleep onset delay and night waking and who consequently slept until 10 a.m. each day. The parents were instructed

to awaken the child at 7 a.m. and not to allow any day sleep prior to 11 a.m.. She was placed in bed at night immediately she appeared tired. This lead to an earlier hour of sleep onset and a reduction in the frequency of night waking.

Bidder et al. (1986) used routine in conjunction with relaxation in an outcome study of forty-four 7-54 month old children, illustrated with two case studies. Parents were instructed to use a routine of quiet play before bed, ensuring the last bottle was given in bed and soothing and relaxing techniques such as massage, stroking and pleasant music when the child was settled and to use similar techniques to handle night waking. Parents were also instructed to refrain from using a light, changing nappies and talking during interactions with their children. The outcome measures were based on attendance rate and length of attendance. Attendance rate (percentage of appointments kept) was approximately 80% and most children (over 90% of the regular attenders) were able to be discharged before 16 weeks of treatment. No behaviour measures were presented.

4.3.6. Studies Employing a Variety of Methods:

Sanger, et al. (1981) used Douglas and Levere's (1980) behaviour modification techniques of extinction, reinforcement, shaping cuing and fading to teach a group of health visitors to work with parents of 16 sleep disturbed children from 12-36 months of age. Thirteen cases were rated by the health visitor as showing improvement which was maintained at 4 months follow-up. This rating was based upon parents' responses to a questionnaire

This pilot study was followed up with a controlled study investigating the efficacy of health visitors trained in behaviour modification techniques with those who had not been (Weir & Dinnick, 1988). Contrary to the authors' expectation there were no

differences between the two groups who both had success rates considerably lower than those usually reported for studies investigating behavioural techniques with infants. The authors found the lack of results difficult to explain but suggested that the health visitors may not have been trained sufficiently well to use the techniques.

Richman et al. (1985) reported the outcome of thirty,12 to 48 month old children treated with a combination of stimulus control, cuing, shaping, graduated extinction (gradually withdrawing the positive reinforcement of attention given by the parents to the wakeful child) and (for older children) reinforcement. Although parents kept a diary of their children's sleep pattern, outcome in this study was based on therapist ratings only. Improvement was rated marked or complete in 90% of the cases and this improvement was maintained at 4 month follow-up.

Seymour, Bayfield et al. (1983) report the results of 193 children from 0-6 years old treated with a combination of stimulus control (attention to bed-time routines) and extinction (ignoring). Older children were also reinforced for sleeping throughthe night (praise and special treats). After four weeks 78% were sleeping through four or more nights a week . These figures were maintained at 1, 3 and 6 month follow-up. In a subsequent study using the same technique Seymour (1987) evaluated four children from 12-47 months of age using a multiple-baseline-across-subjects design. All children showed marked improvements in night waking and settling to sleep over intervention and at 3 month follow-up.

Seymour, Brock, During and Poole (1983) compared results of their standard programme (Seymour, Bayfield, et al., 1983; Seymour, 1987) when given to parents as a written programme with up to 3 hours of staff attention, or given to parents as a written programme without staff support. Both approaches led to earlier and less distressed

settling, decreased frequency of awakening with more rapid settling on awakening and decreased need for parental attention when compared to a wait-list control. The group with staff support, however, achieved these improvements more rapidly.

Weymouth, et al. (1987) also evaluated a written programme but did not specify the type of techniques suggested. They varied the amount of therapist support given. All the children were aged between 23 and 42 months. They found that the five children whose parents received usual therapist contact and the five children whose parents received reduced therapist contact all improved by spending more time in their own beds and by reducing the number of disruptions each night. No behavioural measures were carried out with a third group of ten children whose parents received the advice book only, but their parents responded favourably on consumer satisfaction questionnaires.

4.3.7. Methodological Comments on Behavioural Studies:

There are several methodological problems associated with this area of literature.

4.3.7.1. Limited nature of experimental methods:

Although in recent years some studies have used experimental methods (Johnson, et al., 1981; Lawton, 1985; Moesbergen, 1987; Rickert & Johnson, 1988; Rolider & Van Houten, 1984; Seymour, 1987; Weir & Dinnick,1988) (two of these [Lawton 1985 and Moesbergan 1987] unpublished) the majority present only case studies or give global outcomes of groups of subjects without using experimental manipulation of variables (Bidder et al., 1986; Jones & Verduyn, 1983; McGarr & Hovell, 1980; Pritchard & Appleton, 1988; Richman et al., 1985; Sanger et al., 1981; Seymour Bayfield et al., 1983; Weissbluth, 1982; Weymouth, et al., 1987; Williams, 1959)

4.3.7.2. "Package" nature of interventions:

Many studies evaluate behavioural "packages" or different combinations of techniques for individuals rather than investigating components or individual techniques (Bidder et al., 1986; Richman et al., 1985; Sanger et al., 1981; Seymour, 1987; Seymour, Bayfield et al., 1983; Seymour, Brock et al., 1983; Weir & Dinnick, 1988). In the three studies advocating the use of reinforcement (Richman et al., 1985; Seymour, 1987; Seymour, Bayfield et al., 1983) this was used for older children only, not infants, but the results of children receiving different techniques have not been presented separately.

It would, however, be difficult to investigate extinction without using stimulus control techniques as well, as the use of extinction depends on the child being left in a safe, contained place (i.e., the cot) while extinction is employed. This, of course, results in the cot becoming a discriminative stimulus for the onset of sleep.

4.3.7.3.Limited application of some techniques:

Some techniques presented are suitable for use with only a limited range of children. Scheduled awakening (Johnson et al., 1981; McGarr & Hovell, 1980; Rickert & Johnson, 1988) is not suitable for the majority of children (Bidder et al., 1986) who present with with sleep onset delay as well as night waking as it targets only the latter. Reinforcement is not used with infants because its use depends on a degree of language development. Graduated extinction cannot be used with children who habitually come into their parents' bed on awakening (Lawton 1985). The results of Williams (1959) and Rolider and Van Houten (1984) apply only to bed-time crying. There was no investigation of night waking in these two studies.

4.3.7.4 Large age range of samples:

The large majority of these studies include children of a wide age range (Bidder et al., 1986; Jones & Verduyn, 1983; Rickert & Johnson, 1988; Rolider & Van Houten 1984; Sanger et al., 1981; Seymour, 1987; Seymour, Bayfield et al., 1983; Seymour, Brock et al., 1983; Weir & Dinnick, 1988) despite the possibility of developmental features such as language acquisition, or sleep-state development possibly having an effect on the suitability or efficacy of techniques chosen.

CHAPTER FIVE

ETHICAL CONSIDERATIONS

The approach to infant sleep disturbance taken in this thesis is based on the belief that it is a problem and that therefore, intervention is justified. This belief is different from those of some other authors. It is necessary therefore to consider other beliefs about the ethics of intervention into infant sleep disturbance and justify the position taken.

5.1. BELIEFS ABOUT THE ETHICS OF INTERVENTION:

Ethical concerns about intervention into infant sleep disturbance have three bases: (a) the belief that infant sleep disturbance is a normal and inevitable part of infant development and as such should be accepted, (b) the belief that infant sleep disturbance expresses a need state which should be identified and met, or (c) the belief that some management approaches, especially those based on extinction techniques, are unethical and should not be used.

5.1. 1. The Belief that Infant Sleep Disturbance is Normal and Inevitable:

5.1.1.1. Common assertions :

This belief is usually based on cross-cultural studies. Raphael (1976) asserts that the concept of night waking would be puzzling to mothers in non-western cultures. The problem lies in the expectations and anxieties our culture has about sleep and in the social system which requires mothers to follow a fixed routine without support. Jolly (1985) also makes comparisons of western and non-western

management techniques pointing out that the impact of night waking on families who use a "family bed", for example, is lessened. Werry and Carlielle (1982) attribute sleep disturbances in young children, to:

> "a combination of affluence, limitation of family size and a culture of self-reliance which gives most of these children their own room and decisively separates them at night from their parents." (Werry & Carlielle, 1982, p. 12)

They also suggest that, although professional assistance has a role when parental distress is high it is important not to intervene otherwise, given their finding that there is a high level of parental acceptance and efficacy in dealing with the problem by settling the child repeatedly during the night.

5.1.1.2. Critique of this belief:

There are several difficulties with the position taken by these authors.

1. If sleep disturbance is a normal and inevitable part of infant development, it is also a problematic and troublesome one. Many parents of sleep disturbed infants rate the sleep disturbance as a problem (Basler et al., 1980; Holliday et al., 1987; Ferguson et al., 1981; Ragins & Schachter, 1971; Van Tassel, 1985). Sleep disturbance is associated with maternal malaise (Richman,1981a; Van Tassel, 1985; Zuckerman, 1987) and the disruption of maternal sleep and fatigue (Chavin & Tinson, 1980; Van Tassel, 1985), its relief is associated with improvements in mothers' emotional states (Pritchard & Appelton, 1988). Many parents of sleep disturbed children seek help (Werry & Carlielle, 1982). Infant sleep disturbance is also associated with the development of other behaviour problems (Kataria et al., 1987; Richman, 1981a). Sleep disturbed babies get less sleep than other babies (Bernal, 1973; Holliday, 1987) with possible

effects on their development and other behaviour (Seymour, Bayfield et al., 1983; Seymour, 1987). Many sleep disturbed babies are sedated (Chavin & Tinson, 1980; Moesbergen, 1987; Werry & Carlielle, 1983), sometimes for long periods during times when important developmental tasks must be accomplished.

2. That other cultures take a different approach to child rearing does not necessarily make that approach better. Caudill and Weinstein (1969) describe different advantages of the different approaches to infant care evidenced by mothers in American and Japanese families. The American mother stimulates her baby to greater physical activity and exploration, consequently American infants are more happily vocal, more active and more exploratory of their bodies than are Japanese infants. The Japanese mother however is in greater bodily contact with her infant who is soothed toward physical quiescence and passivity with regard to his or her environment. There is an emphasis on independence, self reliance, exploration and creativity in western society. In order for this to be achieved it may be apparent even in the expectations placed on babies. The relative advantages of these values have not been fully explored and must remain the choice of individual families and cultures.

3. The use of a family bed is always available for couples who choose to use it and is mentioned as a management technique chosen by some parents (Jolly, 1985; La Leche League International, 1981; Thevenin, 1977). It is unlikely, however, that parents who are satisfied with the use of a family bed would present requesting further help.

The option of the sleep disturbed child joining his or her parents, or the rest of the family in a family bed may not be acceptable to some parents, nor does it overcome the sleep disturbance of other family members resulting from sleeping with an active awake child.

5.1.2. The Belief that Infant Sleep Disturbance Reflects a Need State:

5.1.2.1. Common assertions:

The need for human babies to wake and feed during the night is as natural as it is in other mammals (Raphael, 1976). The baby's night time cry signals that there is something wrong, either physically or emotionally (Elizabeth, 1988).

5.1.2.2. Critique of this Belief:

1. The literature which studies parents responses to their night waking children suggests that there are few differences in management between the parents of sleep-disturbed infants and the parents of non-sleep disturbed infants (Blurton Jones et al., 1978; Holliday et al., 1987; Kataria et al., 1987; Moore & Ucko, 1957; Van Tassel, 1985), except that parents of sleep disturbed infants are more likely than parents of non-sleep disturbed infants to use techniques which could be considered nurturing, such as taking the child to their bed (Holliday et al., 1987; Kataria et al., 1987) and feeding during the night (Moore & Ucko, 1957; Van Tassel, 1985). They are also more likely to have used a greater variety of management techniques (Blurton-Jones et al., 1978), probably indicating that they have gone to considerable lengths to meet their children's needs. Given the persistence of sleep disturbance in infants, despite parents attempts to ameliorate it, it is unlikely that sleep disturbance in infancy is a reflection of needs which have not been met.

2. The assertion that the infant needs to be fed at night does not take development over infancy into account. The vast majority of infants can sleep through the night without a feed by 6 months (Moore & Ucko, 1957). The vast majority of sleep disturbed infants have sleep

through the night without feeding at some time prior to their sleep disturbance. It is therefore unlikely that hunger is the basis of their repeated awakening.

5.1.3. The Belief that Techniques Based on Extinction are Harmful :

5.1.3.1. Common assertions:

Several authors have spoken out against the use of techniques involving leaving the child to cry. Bax (1980) and Jolly (1985) both claim that it goes against parents "instincts", Lask (1981) that it causes more problems than it solves, and Jones and Verduyn (1983) do not advocate its use for practical reasons. Kirkland (1985) likens leaving a baby to cry in order to modify his or her sleep behaviour, to torture. Rickert and Johnson (1988) found that many parents were unwilling to use systematic ignoring with their children. The popular literature is vociferous in its condemnation of this practice. Elizabeth (1988) states that infants who are left to cry at night do not learn to be warm or secure human beings, that they will feel frightened, rejected and helpless, that they will lose faith in themselves and their mothers and that these feelings may generalize to other situations. The La Leche League International (1981) ask mothers not to leave their babies to cry alone saying that the comfort and security of loving arms is never wasted. Recently, however, books describing the use of extinction techniques have also become available (McDonald/Leslie Centre, 1985; Ferber, 1985b)

5.1.3.2. Critique of this belief:

1. The belief that the use of extinction based methods causes any harmful effects as it has not been empirically investigated and therefore there is no evidence for it. Pritchard and Appleton (1988), Richman et al. (1985), Seymour (1987) and Seymour, Bayfield et al.

(1983) however, report some beneficial changes in the children who were treated with behavioural techniques in their studies. Sanders et al. (1984) failed to find any negative side effects from the use of stimulus control and contingency management with bedtime disruptions in pre-schoolers.

2. These techniques are used by parents regardless of whether they are advocated by professionals or not. Rickert and Johnson (1988) found that 26 of 27 parents in their study had attempted to ignore their children's night waking at least sometime in the past. Over half of Chavin and Tinson's (1980) sample had done so too. Other studies of parental behaviour report lower rates for the use of extinction but ask about current techniques only (Bernal, 1973; Blurton-Jones et al., 1978). They therefore do not have any measures of techniques which have been attempted in the past. A large number of parents therefore, ignore their infants waking but this is temporary and consequently ineffective. It is likely that these parents use the technique in desperation and do so incorrectly, discontinuing through guilt or through misunderstanding the post-extinction response burst, believing they are making the problem worse. The likely effect of this is that the infants sleep onset delay or night waking would be on an intermittent schedule of reinforcement with a consequent exacerbation of the behaviour. Given the dangers inherent in the technique and the fact that it is frequently attempted, it is preferable that parents be encouraged to use the technique with the advice and support of someone skilled in such procedures. Rickert and Johnson (1988) Seymour, Bayfield et al. (1983) and Seymour (1987) attribute their success with these techniques to the support the families were given.

5.2. CONCLUSION

Infant sleep disturbance may be a common and normal aspect of infant development but it is also a distressing and problematic one. It impacts negatively on the child as well as his or her family members. In this respect it warrants intervention so long as the intervention does not have harmful effects. Regardless of whether or not intervention has harmful effects many parents attempt to intervene with their childrens' sleep but do so without support and in many cases incorrectly.

There has been no systematic investigations of the side effects of behavioural, or other, interventions for infant sleep disturbance in infants so it is impossible to ascertain whether there are negative side effects or not. There is however, some evidence that successful intervention with infant sleep disturbance results in improvements in the infants' behaviour.

Given that many parents intervene with their infants' sleep regardless of whether intervention is advocated by professionals or not and given that what evidence for side effects from intervention is positive, intervention is considered justified in situations where this is the parents' choice.

CHAPTER SIX

A MODEL OF INFANT SLEEP DISTURBANCE

Infants' sleep is relatively unstructured at birth, with sleep occurring randomly and bearing no relation to day or night. It changes over the months of early infancy, becoming organized into a diurnal rhythm with sleep being a routine concomitant with being placed in bed and in association with bed-appropriate cues and lasting for a long unbroken period (Anders et al., 1983; Anders & Weinstein, 1972; Coons & Guilleminault, 1982; Ferber, 1985b). For a sizable minority (or, briefly, for the majority (France, 1982)), namely infants with sleep disturbance, this process is disrupted. The child may never settle to sleep without delayed sleep onset or night waking, he/she may overcome one but not both of these problems or, alternatively, the infant may settle only to develop delayed sleep onset and/or night waking later in the first or second year.

Any theoretical explanation of the process by which infant sleep becomes organized, or disturbed, must take several factors into account. These include, the development of infant sleep states, known associated factors (constitutional, familial and environmental), the nature of sleep and a behavioural analysis of infant sleep disturbance, including the success of behavioural techniques in managing it. This process, therefore is a complex combination of maturational, environmental and experiential factors and as such has parallels with the process by which children learn to bring micturition and elimination under control.

6.1. ESSENTIAL COMPONENTS FOR AN EXPLANATORY MODEL

6.1.1. The Development of Infant Sleep State Organization:

This topic is further discussed in Sections 1.2 and 3.2.2.

Infants sleep is characterized by regular REM arousals at several points during the night. Given that REM sleep habitually precedes awakening in this age group (Ferber, 1985b) it is likely that infants are more vulnerable to waking regularly. Anders (1979) describes the majority of babies waking following REM episodes but that, on most occasions, these babies settle without any intervention and, usually, without their parents being aware that they have awakened. Anders calls these awakenings "simple awakenings". Night wakings, as considered in the sleep disturbance literature, are in fact awakenings that are accompanied by crying, calling or some other means of attracting adults' attention. Anders does not differentiate these awakenings from quiet awakenings except if they result in the baby being taken out of the cot in which case he calls them "complex awakenings." Ferber (1985b) differentiates complete and partial arousals defining the latter as an arousal which is not sufficient for the infant to be aware he/she is awake. Where the arousal is complete and the infant is aware of being awake the night waking infant is unable to return to sleep. He further suggests that night waking is a sleep initiation difficulty, rather than a sleep maintenance difficulty.

Several questions arise from this literature. Is the sleep state organization which leads to vocalized night wakings different from that which leads to other, usually undetected, night wakings? Is the physiological arousal in night wakings accompanied by vocalizations more complete than that in the other, usually undetected night wakings or is the difference at a behavioural level only, in that sleep

disturbed infants have been reinforced for vocalizing by parental attention whereas normal infants have not?

Environmental stimulation may also have a role to play in the development of sleep state organization in the infant. One study, investigating the manipulation of the amount of stimulation received by infants in the first weeks of life, has shown an effect on sleep state development. Gabriel et al. (1981) compared the sleep patterns of two groups of otherwise healthy pre-term infants under different care regimes. One group experienced the usual hospital regime which involved stimulation for care at least hourly (Group 1). The other group was stimulated as little as possible by the co-ordination of care procedures (Group 2). Group 2 showed more definite sleep, both active and quiet with quiet sleep phases being longer. They were also less affected by disturbing events. The authors found that Group 1 infants were more irritable and Group 2 infants had a more stable sleep pattern and suggested that this was a result of the differences in stimulation. It may be that overstimulation of the infant in the form of frequent picking up from the crib, feeding and rocking in fact prevents him or her from establishing a more settled sleep pattern. This overstimulation may, if it carries on over 3-6 months of age, prevent the child from settling to sleep at the same time as most of his or her peers.

Stimulation may affect infant behaviour but infant behaviour may in turn affect the amount of stimulation the child receives. Snow, Jacklin and Maccoby (1980) found a relationship between the amount of crying and the frequency of sleep wakefulness transitions in very young infants. They use this finding as further support for an association between temperament and infant sleep disturbance. Seymour, Bayfield et al. (1983) suggest that an infant with a difficult temperament may affect parental behaviour by producing tentative

and overly responsive parenting which in turn may maintain irritability and wakefulness in the child.

6.1.2. Established Associated Factors

These factors are fully discussed in Chapter Three.

6.1.2.1. Factors intrinsic to the child:

The sleep disturbed child has an increased chance of being first born (Ferguson et al., 1982; Richman, 1981a), having colic (Chavin & Tinson, 1980) and having certain behavioural and temperamental features (Blurton-Jones et al., 1978; Bernal, 1973; Carey, 1974, 1975; Ferguson et al., 1982; Ragins & Schachter, 1971; Richman, 1981a; Van Tassel, 1985). Other physiological and constitutional factors such as perinatal adversity (Bernal, 1985; Blurton-Jones et al., 1978; Moore & Ucko, 1957;Richman, 1981a) gender (Moore & Ucko, 1957) neurological factors (Bernal, 1975; Hauri & Olmstead, 1980) and hereditary (Abe & Shimakawa, 1966) are less well established.

6.1.2.2. Factors intrinsic to the parents:

The only parental characteristic shown to have an association with infant sleep disturbance is that of maternal malaise or depression (Richman,1981a; Van Tassel, 1985).

6.1.2.3. Interactions between parent and child:

Relationships have been found between infant sleep disturbance and the parent behaviours of taking the child to the parents' bed (Holliday, 1987; Kataria et al., 1987; Richman, 1981a; Van Tassel, 1985), feeding during the night (Moore & Ucko, 1957; Van Tassel, 1985), using a wider variety of management techniques (Blurton-Jones

et al., 1978; Moore & Ucko, 1957) and choosing different management techniques (Campbell, 1981; Holliday et al., 1987).

6.1.2.4. Environmental factors:

Multiple births have been associated with infant sleep disturbance (Ferguson et al., 1982) as have family life events or other stresses (Ferguson et al., 1982; Kataria et al., 1987; Richman, 1981a; Van Tassel, 1985).

6.1.2.5. Difficulties facing a theoretical account:

There are serious difficulties with incorporating these factors into a theoretical account, which must incorporate them in a plausible manner. A correlation between a factor and infant sleep disturbance does not necessarily imply a causal relationship. For example maternal depression could as easily be a result of having a sleep disturbed infant as be a cause of it. This also applies to parents using specific management techniques or a variety of management techniques. This reservation does not apply to constitutional and physiological factors and environmental events outside of the control of the child such as the presence of a twin sibling although it is possible that these factors interact with other factors. It is possible that the presence of a sleep disturbed child may influence parents' ratings on family life events scales and other measures of stress.

6.1.3. The Nature of Sleep:

It is important to make explicit several assumptions regarding the nature of sleep.

1. Sleep is a biological necessity, although its functions are not yet fully understood (Carlson, 1980).

2. Time of sleep onset and the duration of sleep are strongly determined by individual diurnal rhythms although they can be influenced by environmental events (Carlson, 1980; Coates & Thoreson, 1981a).

3. Sleep onset may be postponed but not necessarily prevented, by stimulation of various kinds. As the time since the last sleep is prolonged, the intensity and quality of the stimulation required to prevent sleep is increased (Carlson, 1980).

4. The time of onset, depth and duration of sleep are multiply determined (Carlson, 1980). Prior sleep deprivation, amount of fatigue, environmental stimulation at sleep onset, excessive noise, internal states such as illness and unfamiliarity of the environment may impair the onset, duration and depth of sleep. Research into adult insomnia demonstrates the importance of environmental events to the establishment of a regular sleep pattern(Coates & Thoreson 1981b; Morin & Kwentus, 1988).

5. Given the drive to sleep evidenced by sleep-deprived subjects (Carlson, 1980) it is reasonable to assume that the opportunity to sleep is reinforcing and that the potency of this reinforcement increases with the amount of deprivation experienced by the individual.

6. The factors described above, that is: the influence of the environment on sleep, the necessity of sleep for the individual, the strong drive for sleep and its reinforcing properties, point to a strong learned component in sleep which may be evidenced in preparation for sleep and sleep onset as well as in the phenomenon of waking, for example the commonly reported phenomenon of "waking before the alarm".

6.1.4. A Behavioural Analysis of Infant Sleep Disturbance:

The probability of an interaction between developmental and environmental factors in explaining infant sleep disturbance has been suggested by many authors (Anders & Weinstein, 1972; Carey, 1974; France, 1982; Richman, 1981a; Seymour Bayfield et al., 1983) but a complete explanation of this process has yet to be developed. Interaction between these variables should be explicable in terms of well established behavioural principles.

6.1.4.1. The role of classical conditioning:

The physiological basis of sleep state organization in the first few months of life raises the question of whether associations between environmental cues and sleep in this age group have their basis in classical conditioning. Neural activity and endocrine events can be classically conditioned (Miller, 1972). It may be that some components of sleep responses are conditionable or may occur in anticipatory fashion in response to environmental events. In order for a classical conditioning paradigm to explain infant sleep disturbance, the onset of sleep must be established to have an unconditioned stimulus as antecedent which invariably leads to sleep as an unconditioned response. If this is the case then as the onset of sleep is paired with environmental events (such as, in the case of infants, feeding and rocking) these could become conditioned stimuli which elicit sleep in their own right.

However, it is difficult, to determine what the unconditioned antecedents for sleep might be. While there is little doubt that sleep has internal physiological antecedents which function as unconditioned stimuli for sleep, it appears in fact to be a phenomenon which occurs in the absence of external stimulation.

The major difficulty in applying a classical-conditioning account to infant sleep disturbance is that sleep no longer occurs for the sleep disturbed infant, except in response to parental intervention. So what has happened to the unconditioned stimulus? Why has it ceased to elicit sleep? It is possible that maturational factors may play a part and that the sleep of the very young infant is under classical control but that it becomes under operant control with time, however this is impossible to ascertain.

Given the current state of knowledge, therefore, it is not possible to identify both the unconditioned stimulus and the unconditioned response essential for a classical-conditioning paradigm. Such a paradigm therefore is not useful for explaining infant sleep disturbance but does give rise to useful questions for further research.

6.1.4.2. The establishment of infant sleep disturbance:

The experiences through which an infant learns to associate the reinforcing activity of sleep with environmental events such as rocking and feeding rather than with the cot, are best explained using the concept of stimulus control. The environmental events become the antecedent stimuli which precede the behaviour and set the occasion for its occurrence.

Gabriel et al's (1981) findings regarding the association between stimulation and sleep patterns are also relevant at a behavioural level. Is it possible that overstimulation such as continued rocking, picking up and feeding not only prevents the establishment of a settled sleep pattern, but also prevents the establishment of associations with sleep appropriate cues which are formed naturally in less stimulated babies? If this is the case, the onset of sleep would become associated with rocking and feeding rather than with the cot. This suggestion is consistent with Ragins and Schachter's (1971)

finding that children who had difficulty settling required elaborate rituals in order to settle to sleep.

6.1.4.3. The role of operant conditioning:

Patterson (1976) and Patterson and Reid (1973) have emphasized the coercive quality of childhood behaviour such as crying. In the sleep disturbed infant this behaviour may be temperamental in origin, and may produce overly responsive parenting (Seymour, Bayfield et al., 1983), or may occur later in association with complete arousals precipitated by REM bursts or illness. Crying and calling is reinforced by parental attention which if provided intermittently, as when a variety of approaches are tried, shapes up behaviour which is likely to be resistant to change. The crying and calling ceases in response to parental attention in the short term but has an increased likelihood of recurring in the long term. The parents' behaviour in turn is negatively reinforced by the cessation of the aversive crying and calling and therefore they continue the rocking and feeding which reinforces the coercive behaviour. The situation is therefore exacerbated by the operation of a behaviour trap where parent and child both continue to emit maladaptive behaviour which may over-ride the operation of normal developmental sequences.

Infant sleep disturbance can be conceptualised as a sleep initiation difficulty where sleep onset is delayed either when the infant first settles to sleep or sleep cannot be resumed after awakening (Ferber, 1985a, b). Infant sleep disturbance can also be conceptualised as inappropriate behaviour (i.e., calling out or crying), occurring after awakening has occurred. An operant-conditioning account can provide an explanation in both these cases. The concept of stimulus control explains sleep onset delay, while the concept of contingencies

operating to maintain crying and calling out on awakening explains the occurrence of inappropriate behaviour in response to awakening.

6.1.4.4. Successful behavioural interventions:

At first glance it appears that a variety of very different and perhaps contradictory approaches are successful in modifying infant sleep disturbance. Packages including extinction and stimulus control techniques are successful (Moesbergen, 1987; Richman et al., 1985; Seymour, 1987; Seymour, Bayfield et al., 1983; Seymour, Brock et al., 1983) as is graduated extinction (Lawton, 1985) and fading (Jones & Verduyn, 1983) where the reinforcement for waking is gradually reduced or withdrawn. It is not so clear however how graduated extinction works where the criterion for ignoring is gradually increased (Rolider & Van Houten, 1984). One might expect longer and longer periods of crying to be shaped up using this procedure. The authors explain the efficacy of their technique by suggesting that the increases in crying time occur in steps too large for the crying behaviour to remain in contact with the reinforcer thus resulting in extinction through ratio strain (that is, in this case, the inter-reinforcement interval has increased to the extent that the behaviour is no longer under the control of the reinforcer).

Bidder et al. (1986) claim success with the use of relaxation and bed-time routine, but use only attendance figures at the clinic as their criteria for success. If these techniques are successful they can also be explained in terms of waking, staying awake and calling out undergoing extinction as well as differential reinforcement of behaviour incompatible with any of these responses. They point out that parents were instructed to refrain from using a light, changing, feeding and talking to their child during night-time awakenings. These potentially powerful reinforcers were thereby removed. Similarly, their use of relaxation, which consisted of stroking and

massaging the baby in bed, could have reinforced the infant for passively waiting for sleep onset.

The manner in which scheduled awakenings works is also unclear. McGarr and Hovell (1980) describe the procedure as reinforcing sleep behaviours. Whether this is the mechanism, is difficult to ascertain.

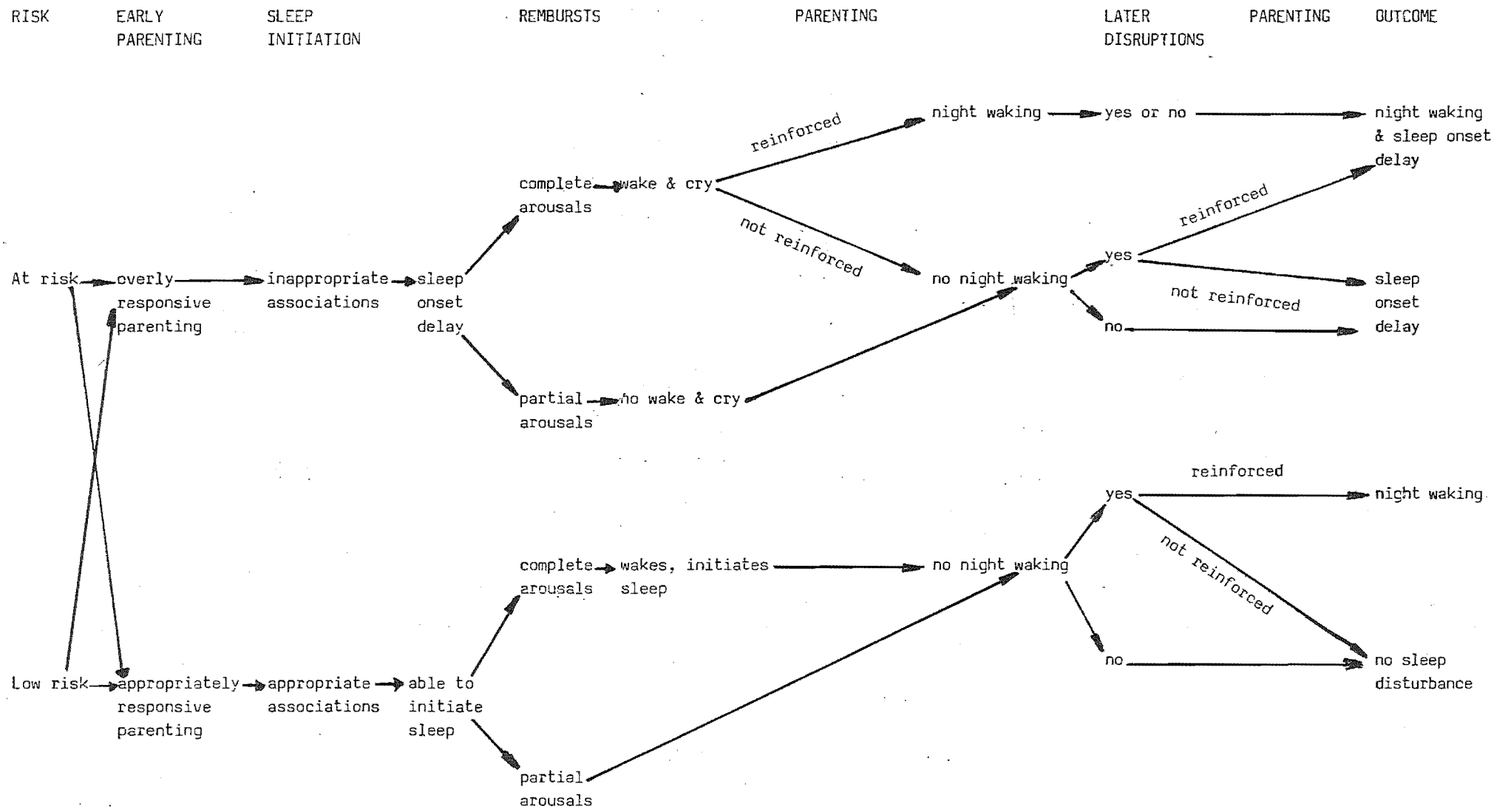
It is possible that scheduled awakening works by replacing the endogenous stimulus (presumably physiological) for awakening, with an exogenous stimulus (the parents). By lengthening the elapsed time prior to the scheduled awakening, the opportunity to awaken to the exogenous stimulus is delayed until the only opportunity the child has to awaken to the exogenous stimulus is in the morning. However, this explanation is difficult to reconcile with current knowlege regarding infant sleep cycles (Anders, 1979; Ferber, 1985b).

Scheduled awakening also prevents the infant's contact with the latent contingency for crying. What is clear is that the child no longer has an opportunity to awaken spontaneously and therefore does not come into contact with any reinforcers.

The success of these techniques is therefore consistent with the operant conditioning explanations offered above.

Figure 2

The model


RISK
EARLY PARENTING
SLEEP INITIATION
REMBURSTS
PARENTING
LATER DISRUPTIONS
PARENTING
OUTCOME
At risk
overly responsive parenting
inappropriate associations
sleep onset delay
complete arousals
wake & cry
reinforced
night waking
yes or no
night waking & sleep onset delay
not reinforced
no night waking
yes
reinforced
sleep onset delay
not reinforced
no
partial arousals
no wake & cry
Low risk
appropriately responsive parenting
appropriate associations
able to initiate sleep
complete arousals
wakes, initiates sleep
no night waking
yes
reinforced
night waking
not reinforced
no
no sleep disturbance
partial arousals

6.2. MODEL EXPLAINING INFANT SLEEP DISTURBANCE

Figure 2 presents a model which incorporates known associated factors, developmental factors and established behavioural principles. It is an extension and development of the earlier model presented by the author (France, 1982; see Figure 3). It incorporates all these factors by a consideration of probable events at various stages across the first year of life.

6.2.1 The Role of Neonatal Characteristics:

Some infants may be placed at risk of developing sleep disturbance through being born with particular physiological (e.g., sleep state organization) and constitutional factors (e.g., temperament) . These factors in turn influence parental behaviour as Seymour, Bayfield et al. (1983) suggest so that from birth fussy, crying babies are handled in an overly responsive manner by concerned parents.

6.2.2. Birth to 3 Months:

As this process continues, possibly exacerbated by the occurrence of colic, inappropriate associations between parental handling and the onset of sleep are formed. The parents of low risk infants, that is infants without these physiological and constitutional factors, may also choose to handle their children in an overly responsive manner leading to the same inappropriate associations forming in otherwise low risk infants. Similarly, parents of high risk infants could choose to handle their infant with minimum stimulation and by encouraging the formation of appropriate associations between the onset of sleep, bed-time, and the cot. Depending how these factors combine, the infant either develops appropriate associations for the onset of sleep, leading to him/her being able to settle to sleep without undue delay,

or he/she forms inappropriate associations with the onset of sleep and cannot settle without a delay incorporating a ritual of feeding or rocking. This is probably determined by the age of approximately 3 months and is one determinant of whether the infant settles to sleep during the night at this stage.

6.2.3. Three to six months:

As the infant's need for regular feeding throughout the night decreases and the infant's sleep is organized into clear and predictable sleep cycles, the nature of these cycles can influence whether the infant's sleep develops to include a long unbroken sleep at night. If the arousals associated with the regular REM bursts are partial the infant does not develop night waking at this point but settles to sleep through the night although he/she may have sleep onset delay if this has been established prior to 3 months. If the arousals associated with REM bursts are complete he/she will wake completely and may cry depending at least in part on whether he/she is able to initiate sleep without an elaborate ritual. Once night crying occurs it will continue if it is reinforced by parental attention. If night crying is not reinforced it will not continue although whether the waking in response to REM bursts continues has yet to be established.

6.2.4. Six months to Two Years:

Many babies who had settled to sleep by six months revert to waking later in their first or second year. It is likely that this is precipitated by a disruptive event such as illness, or a move of house. These events stimulate waking and crying which in turn are then influenced by parental reinforcement.

6.2.5. General Comments:

This model explains why individual management techniques such as rocking or feeding have not been shown to be associated with infant sleep disturbance. There are multiple points during the infant's development at which sleep disturbance can start and multiple ways in which it can start.

This model leads to fruitful areas for research. It could lead to preventive studies which could be experimentally investigated. The interaction between developmental aspects of sleep and environmental events is also a rewarding research area. Does parental intervention affect the manner in which the infant's sleep develops, perhaps by blocking the establishment of a stable sleep pattern? Does reinforcing night crying affect the likelihood that the infant will awaken during REM bursts? Does extinction of night crying also affect the frequency of awakenings associated with REM bursts?

The model also provides a structure within which various empirically derived treatments can be analysed and explained.

SECTION TWO: THE EXPERIMENTS

CHAPTER SEVEN

RATIONALE, AIMS AND HYPOTHESES

7.1 RATIONALE

The four studies described in this thesis were initiated by the author (KGF) as the University of Canterbury Sleep Project (Canterbury Sleep Project) during the period from 1981 to 1985. The author (KGF) pursued the research reported here while, in addition, two students completed Master's Theses on related topics. These considered the treatment of sleep disturbance in infants and young children (Moesbergen, 1987) and the treatment of infant sleep disturbance using graduated extinction (Lawton, 1985; Lawton, et al., 1989).

Up to the time this series of studies was planned (1980) there had been no experimental investigation of the management of infant sleep disturbance other than that by Williams (1959). Similarly, despite the widespread use of sedative medication with young children (Chapter Four), Russo et al's (1976) investigation of diphenhydramine with pre-schoolers was the only attempt to evaluate the use of such substances.

This lack of experimental investigation into infant sleep disturbance left many questions unanswered. Three of specific interest to this investigation were:

1. The efficacy of behavioural and sedative management of sleep disturbance.
2. The parents' role in the etiology of infant sleep disturbance.
3. The ethics of using behavioural interventions with infants who have sleep disturbances.

In order to address the lack of experimental investigation of issues 1 and 2 above and in the sedative management of infant sleep disturbance, two studies were undertaken. First, a precursor to the model presented in Chapter Six was developed (France, 1982). This is presented in Figure 3. The model's predictions about the relationship between parents' behaviour and infant sleep disturbance, led to the endorsement of extinction as a management technique for infant sleep disturbance, and its investigation, as described in Study One. Second, the use of the sedative trimeprazine was evaluated in Study Two, thereby pursuing the question of the effectiveness of such medication.

During the course of this research there has been noticeable growth in published experimental studies of sleep disturbance including the investigation of extinction (Rickert & Johnson, 1988; Seymour, 1987; Weir & Dinnick, 1988) and trimeprazine (Richman, 1985; Simonoff & Stores, 1987) in the management of infant and pre-school sleep disturbance. These studies have methodological faults (see Chapter Four) which are corrected in Studies One and Two. Study One improved the methodology of the research: a) by considering infants as a discrete group not including them in with older children, b) by considering extinction as a separate technique rather than as part of a package, although it has some stimulus control elements of necessity and c) by measuring the reliability of parental recordings.

The two additional studies which form part of the Canterbury Sleep Project in part replicated Study One and extended the research programme in various ways. Lawton (1985) investigated graduated extinction while Moesbergen (1987) investigated behaviour

management with pre-schoolers. Lawton (1985) introduced the innovation of the switch-mat as a further measure of the reliability of parental reports.

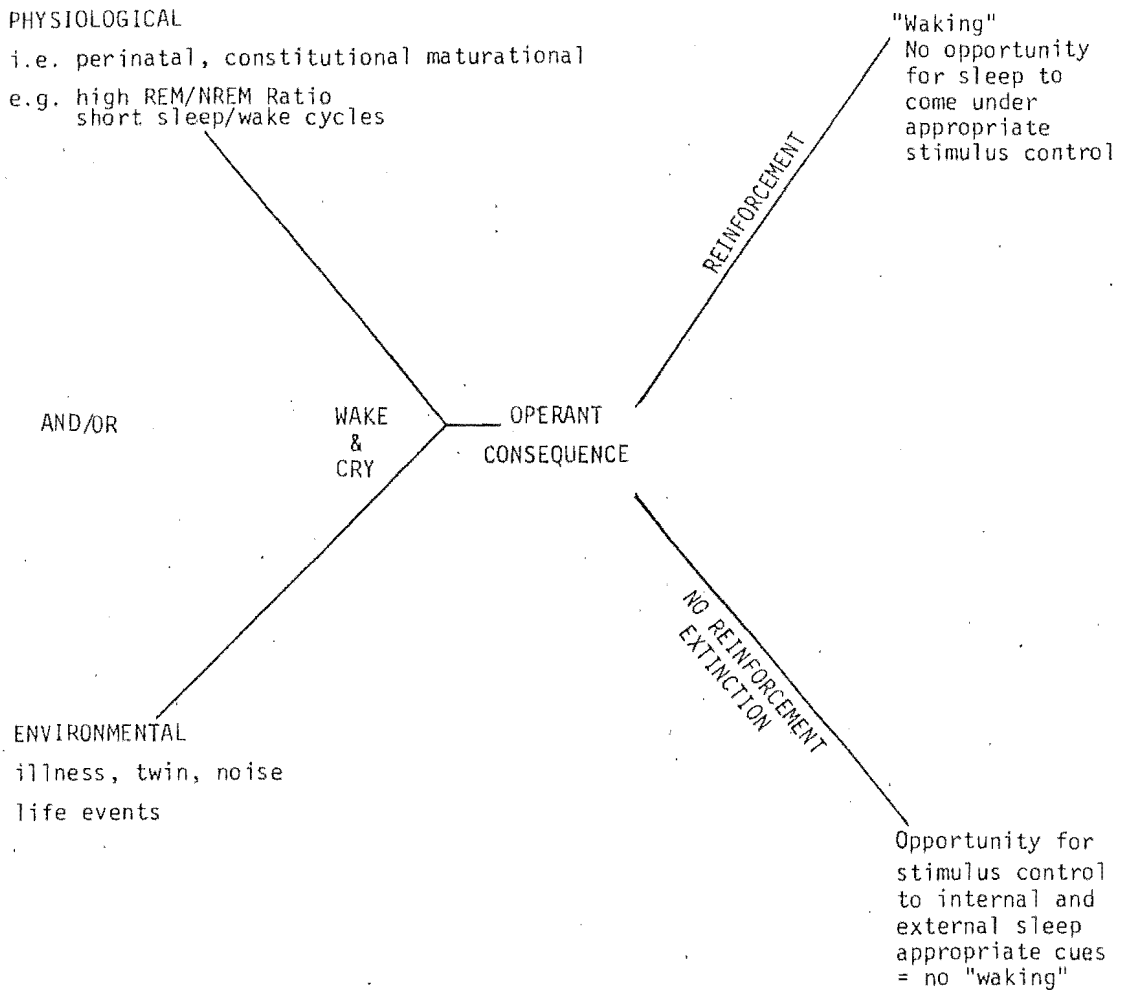
Study Two also addressed faults evident in previous studies by confining itself to a consideration of sleep disturbed infants, in contrast to Richman (1985) and Simonoff and Stores (1987) whose subjects covered a much wider age range. Further, Study Two used two different dose rates of trimeprazine and used single-subject methodology in order to allow a close investigation of inter- and intra-individual differences in response to the medication. Reliability of parental recording was also measured.

Contemporary literature on sleep disturbance in young children has separately investigated the use of behavioural techniques and sedative medications, but the effects of combining the two has not been reported. This was the purpose of Study Three which sought to establish whether the use of trimeprazine in conjunction with extinction decreased infant and parental distress while remaining an effective way to decrease infant sleep disturbance.

Study Four was an initial attempt to address two of the ethical questions posed about the management of infant sleep disturbance in Chapter Five, none of which have been hitherto addressed experimentally. These are specifically, whether infants are detrimentally affected by the use of behavioural techniques and whether it is possible to reduce infant distress and parental anxiety by the use of sedative medication in conjunction with a behavioural programme.

Figure 3

Original model (France, 1982)



7.2. AIMS AND HYPOTHESES

In the following section "S" denotes Study and "H" denotes Hypothesis.

7.2.1. Study One:

Study one sought to establish, using a multiple-baseline-across-subjects design, the efficacy of extinction in the management of infant sleep disturbance by training parents to modify the way in which they dealt with their sleep disturbed infants.

The following hypothesis was formulated:

S1,H1: That there would be clinically significant reductions in all sleep disturbance measures in response to the implementation of changes in the parents' behaviour.

7.2.2. Study Two:

Study Two sought to investigate the use of two different treatment regimes of trimeprazine in the management of infant sleep disturbance in two different groups of subjects. A double-blind, multiple-baseline-across-subjects design was used in order to allow an examination of individual differences in response to the medication as well as to detect adaptation to the medication and drug withdrawal insomnia, should they occur.

The hypotheses for Study Two were broad and incorporated alternatives since, at the time the study was instituted, there was very little information, other than parents' comments, about the possible effects of trimeprazine.

The following alternative hypotheses were formulated:

S2,H1: That trimeprazine would have no measurable effect on infant sleep disturbance at either drug regime.

or S2,H2: That both active drug regimes would result in some measurable effect on infant sleep disturbance but that there would be a similar effect during treatment with the placebo, both effects resulting from parental expectations only.

or S2H3: That there would be reductions on all sleep disturbance measures during treatment with trimeprazine at both drug levels, but that these changes would be minor, and transient.

or S2H4: That there would be reductions on all sleep disturbance measures during treatment with trimeprazine at both drug levels, and that these changes would be clinically significant.

And that if S2,H3 or S2,H4 were true,

S2,H5: That there would be more reduction in sleep disturbance in response to the higher drug level.

Further hypotheses were:

S2,H6: That there would be no changes in any sleep disturbance measures during treatment with placebo (if S2,H2 were false).

S2,H7: That, if S2,H3 and/or S2,H4 were true, reductions in sleep disturbance would be maintained after treatment with trimeprazine at the higher dose, but not at the lower dose.

S2,H8: That there would be evidence of adaptation to the drug and drug withdrawal insomnia at both levels of administration.

S2,H9: That there would be large intra- and inter-individual variations in response to trimeprazine.

The limited information which was available from clinical experience with parents whose children had been treated with trimeprazine indicated: a) that trimeprazine would reduce infant sleep disturbance but that this reduction would be minor, b) that there would be a greater response to the higher dose of trimeprazine than to the lower dose, c) that there would be adaptation to trimeprazine at both doses, but no drug-withdrawal insomnia, d) sleep disturbance

would return rapidly to pre-treatment levels once the drug was withdrawn.

7.2.3. Study Three:

The first aim of Study Three was to use a double-blind, between-groups design, to investigate the efficacy of trimeprazine combined with behaviour management as a treatment for infant sleep disturbance, compared with behaviour management on its own or in conjunction with a placebo. The second aim was to use the same subjects to establish whether the use of trimeprazine in conjunction with behaviour management resulted in less infant distress and parental anxiety than behaviour management used on its own or in conjunction with a placebo.

The following hypotheses were formulated:

S3,H1: That there would be significant reductions in sleep disturbance measures for groups treated with extinction solely, or extinction plus either trimeprazine or placebo.

S3.H2: That changes in all groups would be maintained over time.

S3,H3: That there would be significantly less crying from infants treated with extinction plus trimeprazine than infants treated either with extinction on its own or extinction plus placebo.

S3,H4: That the security of infants treated with extinction plus trimeprazine would be higher during the intervention period than that of infants treated either with extinction on its own or extinction plus placebo.

S3,H5: That parental anxiety would increase in all extinction groups over the first few days of the intervention period.

S3,H6: That parental state anxiety during the intervention period would be less in parents of children treated with extinction in conjunction with trimeprazine than the other groups.

7.2.4. Study Four:

Study Four aimed to use the same subjects, in comparison with a non-treated sleep disturbed control group and a normal sleep control group, to establish whether the use of behaviour management had any effect on infant security and a wide variety of other infant characteristics. The hypotheses for this experiment were broad and non-specific in order to allow for the possibility of positive and negative effects, as well as no effects at all.

The following hypotheses were formulated:

S4,H1: That treatment by the use of extinction would have a positive impact on the treated infants compared with the controls.

S4,H2: That treatment by the use of extinction would have no measurable impact on the treated infants compared with the controls.

S4,H3: That treatment by the use of extinction would have a negative impact on the treated infants compared with the controls.

CHAPTER EIGHT

PROCEDURES, SUBJECTS AND RELIABILITY

8.1 PROCEDURES COMMON TO ALL STUDIES

8.1.1. Subject Selection:

The subjects of the experimental groups were 64 infants between 6 and 24 months of age, selected by taking consecutive referrals at the time of each study, from the referrals made to the Canterbury Sleep Project between October 1981 and January 1984 . The referrals came from Plunket nurses (community health nurses). All children were referred for management of sleep disturbance, which had to be of concern to the parents.

Of the whole 131 referred to the Canterbury Sleep Project, six were not accepted, following initial interview. These children were excluded on the grounds of any condition which would make intervention impossible or inadvisable. There were two children with physical illness (asthma and umbilical hernia), one with developmental delay, one with emotional disturbance (marked separation anxiety), and one with other family problems (severe marital discord). These families were referred to other community agencies. Three children had parents who did not come for the first appointment and ten children had parents who decided after the initial appointment that they did not want to take part.

Other referrals to the project were used in other studies. Thirty infants were used for the research done by Moesbergen (1987) and Lawton (1985). Eighteen additional cases, including five children whose parents did not accept drug treatment, were used as pilot cases

or for staff training. Parents were informed of the aims of the study they were selected for and consented to their child's participation.

A further 28 children were recruited to form the control groups for Study Four. These children are described in Chapter Twelve.

8.1.2. Assessment Procedures:

8.1.2.1. Structured Interview:

After the referral was received both parents and the child were invited to attend an initial interview aimed at screening for suitability of inclusion, assessing the nature and extent of the sleep disturbance, collecting information regarding the past and present strategies used by the parents to manage the sleep disturbance, as well as family details including current stresses on the family, family life events over the life of the child, and other concerns about the child that the parents may have.

A structured interview was used which was developed by the Author (see Appendix A).

At the end of this interview, the study the child had been selected for was briefly described in order to gain the parents acceptance in principle. The parents were then asked to collect baseline measures for a specified amount of time and an appointment was made for intervention instructions to be given.

8.1.2.2. Daily Sleep Diary:

This was designed by the Author and consisted of a booklet of daily record sheets which were supplied to parents with instructions for their use (see Appendix B).

They allowed for the following aspects of infant sleep behaviour to be measured:

1. The duration and location of day-time sleeps.

2. The actual bedtime at night, the bedtime the parents would have considered ideal, and the reasons for any discrepancy between the two (measure of bedtime delay).
3. The time from when the child was placed in bed until silence, and the quality of the noise from the child during this time, for example quiet playing, crying or talking (measure of sleep onset delay).
4. The number and duration of any night wakings.
5. Details of parental responses to each awakening.
6. Awakening time the following morning.

Parents were asked to record this information as it occurred, or first thing in the morning.

8.1.3. Therapists

The Author, a clinical psychologist with several years experience working with children and families, was a therapist for all three studies. She was assisted with some subjects in Studies Two and Three by research assistants Carolyn Lawton and Kevin Moesbergen, graduate students who worked under her supervision.

8.2. MEASURES COMMON TO ALL SUBJECTS

8.2.1. Frequency of Night Waking:

Night waking was defined as any noise from the child, sustained for more than one minute, heard between the time of sleep onset (first substantial period of quiet) and an agreed upon waking time (usually 6 am). Although it was not possible to discriminate systematically between sleep and quiet wakefulness this was not considered to be problematic given that, together, both constitute typical infant sleep patterns (Anders, 1979).

8.2.2. Duration of Night Waking:

This included the time the child was awake for each awakening including the time he/she was being attended to by the parent until the child was silent after return to the cot.

8.2.3. Sleep Behaviour Scale:

Each infant's sleep pattern was assessed using weekly scores on the Sleep Behaviour Scale (Richman,1981a, 1985), with higher scores indicating more sleep disturbance. This scale has no established psychometric properties but does provide a standard, comparable method of summarizing a wide range of observations, thus accommodating variability in the topography of infant sleep disturbance. Sleep-relevant behaviours assessed by the scale included: a) sleep onset delay, defined as elapsed time from being put to bed (bedtime) until silence, b) the number of nights per week in which night waking was observed, c) mean number of awakenings each night, d) weekly mean time awake per awakening, e) mean total hours spent sleeping per day and f) total hours spent in the parent's bed per week. Scores on individual items were summed to give a score of 0-24 (see Appendix C).

8.3. RELIABILITY: METHOD AND OVERALL RESULTS

8.3.1. Methods of Reliability Assessment:

A reliability measurement system was developed for Study two using a voice-activated relay (VAR), with a microphone 1 m from the child's head calibrated to operate at 80 db. This recording device was coupled to an Esterline-Angus event recorder (see Appendix D).

For the baseline, intervention and first follow-up of Study One which was started before the development of the voice activated recording system a record was kept of parents' descriptions of their child's sleep pattern during the daily telephone checks and this was compared with the written record sheets when the latter were collected.

A second follow-up was collected for Study One two years after intervention. Further reliability was collected at this point using the VAR along with a switch-mat (1 m by 0.5 m) placed on the floor next to the child's bed designed to detect movement of either parent or child at the side of the bed. This had been developed for Lawton (1985) and was connected to the Esterline-Angus event recorder (see Appendix D).

Collecting event records was not possible for 12 subjects owing to traveling distance, children sharing a bedroom or the child reacting to the noise of the machine. In these cases the parent who was not recording the infants sleep provided an independent record of the infants sleep pattern. In all these cases this was supplied by the father.

8.3.2. Overall Results of Reliability Assessment:

Reliability results for the subjects of individual studies are presented in the appropriate chapters. Overall results of all subjects who had reliability recordings taken with either the VAR or father's recordings are presented here to provide a measure of the overall reliability of parental recording of infant sleep disturbance. This is necessary as time and machine unavailability made it impossible to collect adequate reliability measures for the 45 subjects of Study Three. It was felt by the time that Study Three was started, that the reliability measures taken in the preceding studies had adequately demonstrated that parents are reliable recorders of infant sleep disturbance.

Reliability data was available for 28 subjects in all. Six were from Study One, twelve comprised the Study Two subjects and eight were from Study Three. Data was also available from two other subjects who did not take part in the three studies presented in this thesis but were used to obtain further reliability assessment.

Using a point by point agreement ratio (Kazdin, 1982) levels of inter-observer agreement were calculated separately for frequency and duration of awakening. Positive agreement for an awakening was defined as both recording systems noting its occurrence within a 15 minute period. For duration of awakening, agreement was scored if the two values were within 5% of one another.

8.3.2.1. Voice-Activated Recorder: N= 16 subjects:

Percent of recordings: Reliability checks were obtained for an average of 24% of the nights on which data was recorded for this group. The range was 7-71% of subject nights. The low 7% figure was accounted for by one subject for whom a large part of the reliability was unscorable owing to the date not being marked clearly on the event sheets. With this subject removed reliability was obtained for 30% of nights that data was recorded.

Frequency of awakenings: The mean level of agreement between the VAR and parents record was 87% (range 54% to 100%) for number of awakenings.

Duration of awakenings: The mean level of agreement between the VAR and parents record was 85% (range 54% to 100%) for duration of awakenings.

8.3.2.2. Father's reliability:N= 12:

Percentage of recordings:

Reliability was obtained for an average of 10% of nights on which data was recorded for this group. The range was from 6-20% of subject nights.

Frequency of awakenings. The mean level of agreement between fathers' and mothers' records was 87% (range 42% to 100%) for frequency of awakenings. The lower figure of 42% was from a fathers' record which was very sparse and intermittent. With this figure removed the agreement was 93%.

Duration of awakening: the mean level of agreement between fathers' and mothers' records was 85% (range 41% to 100%) for duration of awakenings. The low figure of 41% was from a father who consistently rated the infants duration of awakening as markedly shorter than the mother's rating. Without this figure the mean is 88%.

CHAPTER NINE

STUDY ONE

9.1. INTRODUCTION:

Previous investigations into environmental factors in the etiology of night waking show no clear causal relationship between parental and infant behaviour (Bernal, 1973). However the successful application of behavioural interventions, such as Jones and Verduyn (1983), Richman et al. (1985), Rickert and Johnson (1988), Seymour, Bayfield et al. (1983), Seymour, Brock, et al. (1983), Seymour and France (1984), and Williams (1959), is strongly suggestive of a role for parental attention. It is possible that the failure of etiological studies to separate initiating from maintaining causes may be obscuring the picture, in that temperamental and maturational factors are possibly more central to the former, with environmental factors, such as parental behaviour, acting as key causal agents in maintenance. This hypothesis is supported by the finding that parents of night waking infants try a wide range of management techniques (Moore & Ucko, 1957; Blurton-Jones et al., 1978). This variability of parental responding, together with the persistence of night waking, is a typical effect of intermittent reinforcement schedules.

The parents' role in maintaining night waking may be by reinforcing behaviours such as spontaneous calling-out and, because stimuli associated with parental responses may become discriminative stimuli for the resumption of sleep (Ferber, 1985b). If so, then extinction may be an effective intervention for the management of

infant sleep disturbance, since it removes the reinforcer and permits natural stimuli to exert control over sleep.

The success of training parents to act as therapists for their own children has been well established (Berkowitz & Graziano, 1972; Johnson & Katz 1973; O'Dell, 1974). Recent studies which have instructed parents in the use of extinction, stimulus control and other operant strategies, in managing their children's sleep disturbance have been effective, (Jones & Verduyn, 1983; Richman et al., 1985; Rickert & Johnson, 1988; Seymour, Bayfield et al., 1983; Seymour, Brock et al., 1983; Seymour & France, 1984), but all have failed to separate infants from other older subjects, despite clear developmental differences in the organization of sleep stages and the impact language has on the types of management techniques available after for older children. In addition, several of these studies lack experimental rigour in that they do not apply the same interventions across subjects (Jones & Verduyn, 1983; Richman et al., 1985) or use AB designs (Williams, 1959).

There is an extensive early literature which establishes the utility of operant conditioning with infants (Etzil & Gewirtz, 1967; Fitzgerald & Porges, 1971; Hulsebus, 1973). This has led, more recently, to a consideration of the role operant conditioning of infants may play in early intervention. Lancioni (1980) asserts that infant's behaviour can be strengthened and weakened, that this can occur in a wide variety of settings, that any changes made can be maintained and that parents can carry out interventions after minimum training.

The choice of operant technique to use with infants' sleep is limited by their lack of verbal behaviour. It is preferable to change behaviour using reinforcement than by more restrictive techniques such as extinction or punishment (see the "Doctrine of the Least Restrictive Alternative" in Cooper, Heron & Heward, 1987 (p416)). Reinforcement for sleeping through the night can and has been used in

older children (Moesbergen, 1987; Seymour, 1987; Seymour, Bayfield et al., 1983) by delaying its presentation until the morning but it is considered difficult, if not impossible to form an association between behaviour during the night and reinforcement in the morning in infants. This leaves the use of extinction as a defensible alternative.

The present study sought to establish, using a non-concurrent multiple-baseline-across-subjects design (Watson & Workman, 1981), the efficacy of extinction in the management of infant sleep disturbances, including night waking and other relevant behaviours. Extinction is defined as a procedure in which the putative reinforcer (parental attention) is no longer delivered for a previously reinforced response (crying and calling out when awakening during the night). Procedures promoting appropriate stimulus control are used in conjunction with extinction. Going to sleep when first placed in bed and returning quietly to sleep following subsequent awakenings are both assumed to be under the control of discriminative stimuli. In these cases stimulus control procedures refer to both the pattern of family activity which predicts the immanence of sleep time and the environmental conditions which accompany return to sleep following night-time awakening. Attention, therefore must be paid to the antecedent stimulus conditions as well as to the reinforcing consequences of the behaviour.

9.2. METHOD

9.2.1. Subjects and Setting:

Subjects were two girls and five boys, ranging in age from 8-20 months. All were of European descent and covered a range of SES levels. Other demographic information is presented in Table 7.

Table 7.
Demographic characteristics of children

Child N=7	Age (Months)	Gender	Birth Order[1]	Father's Occupation[2]	Socioeconomic Level[3]
1	8	F	1	Fisherman	4
2	8	M	2	Cylinder Controller	4
3	8	M	1	Travel Agent	2
4	20	M	1	Research Officer	2
5	12	M	2	Wharehouseman	4
6	10	F	1	University Lecturer	1
7	16	M	2	Farmer	2

[1] All children were youngest children.

[2] All mothers were full-time homemakers.

[3] Elly and Irving (1972)

All children presented with night waking; many had other sleep disturbances. These sleep disturbances varied across subjects in age of onset and whether there was a precipitating factor (see Table 8). Most parents had attempted several management strategies (Table 9).

The participating families comprised all referrals to the Sleep project over the relevant time period. None of the children were perceived, by their parents, to have other developmental or behaviour problems except for Child One who had a feeding problem and Child Three who was described as overactive. Children Three and Seven had a history of ear infections. The

Table 8.

Sleep problems, age of onset(months) and precipitating factors reported by parents for each child.

Child N=7	Nightwaking No. per night	SleepOnset Delay	Bedtime Delay	Parents' Bed	Ageat Onset	Precipitating Factor
1	5	-	+	+	0[1]	-
2	5	+	-	-	0[1]	-
3	3	+	-	-	5	Illness
4	1	+	+	+	8	Weaning
5	4	+	+	+	4	-
6	3-4	-	+	+	5	Illness
7	2-6	-	-	-	0[1]	-

0[1] means that the child had never settled to sleep through the night. + means the problem was present, - means the problem was absent.

Table 9.

Past (P) and current (C) management attempts reported by parents

Child N=7	Pacifier	Leave to cry	Feed	Comfort	Medication	Reprimand	Parents' Bed
1	P	-	C	C	P	-	C
2	P	P	C	C	P	-	-
3	-	P	-	C	C	-	-
4	-	-	P	C	P	C	C
5	-	P	C	C	C	-	C
6	-	P	C	C	P	-	C
7	-	P	C	C	C	-	-

families of Children One, Six and Seven had experienced some stressful life events since their children's birth.

9.2.2. Initial Assessment:

All parents were interviewed with their infants and assigned a baseline length. Baseline lengths, which varied from 1-7 weeks, were assigned in strict order of presentation at first interview. Interview procedure followed that described in Chapter Eight. No child was excluded from this study on the basis of interview information. All recordings were on the daily diaries described in Chapter Eight.

9.2.3. Procedure

Baselines, during which parents were instructed to respond to their child as they normally did, were at least seven days in duration. During parent training, at the end of baseline, emphasis was given to the infants vulnerability to waking based on REM-NREM sleep cycles (Anders et al., 1980), the probable role of reinforcement in maintaining the behaviour, and the importance of stimulus control, that is, consistently attaining a goal bedtime and using a standard bed-time ritual. When necessary, assistance was given to parents in deciding alternative sleeping arrangements. The principle of extinction was described, as was the importance of consistent planned ignoring. Parents were instructed to discontinue the use of previous management techniques and they were prepared to expect an initial increase in the frequency and variability of awakenings. They were also cautioned against inadvertently using intermittent schedules of reinforcement.

The following standard program was prescribed;

> At bed-time, carry out your usual bedtime routine (story, song, etc) then place (child's name) in bed. Bid him/her "goodnight" and immediately leave the room. Do not return unless absolutely necessary. If absolutely necessary, check on your child (when illness or danger is suspected), but do so in silence and with a minimum of light.

Parents were also questioned regarding their ability to determine illness and distress in their child and were instructed to call the experimenter (available 24 hours per day) if there was any concern over the programme or the child's well-being. The child's need for continued day-time interaction with parents was stressed. In the case of illness, parents discontinued the program until the symptoms abated. Parents were telephoned daily until the child had slept through on two or three occasions and the parents were comfortable with less frequent contact (usually after one week) and intermittently thereafter.

Contingent upon the development of a stable sleep pattern, defined as the elimination of waking other than once or twice in a week, a maintenance programme was instituted and record keeping discontinued. Parents were instructed to check their child if he/she called but to leave immediately if there was no acceptable reason for the call. Should waking, in excess of once or twice a week, resume, parents were instructed to return to the initial program. In each case the intervention programme was in effect for four weeks.

Data recording was conducted by the parent(s) using the Daily Sleep Diary described in Chapter Eight. The record sheets were completed daily during the baseline and the four weeks of the intervention phase. Two weeks follow-up data was collected at approximately three months and two years after initiation of the maintenance program.

9.3. MEASURES:

Measures were as described in Chapter Eight with the addition of parental attends:

9.3.1. Parental Attends:

These were defined as any interaction between the parents and their child from the time he or she was bid goodnight until he or she was taken from the cot in the morning.

9.3.2. Reliability Assessment:

Results of reliability assessment for this study are presented in Table 10. Two methods of checking the reliability of parental records were used. A record was kept of parents' descriptions of their child's sleep pattern during the daily telephone checks and this was compared with the written record sheets when the latter were collected. By the second follow-up, the reliability measurement system using the VAR, had been developed. In addition it was possible to use the switch-mat for measuring the reliability of parental attends which had been developed for Lawton's (1985) study. The VAR and switch-mat were employed with Children Three, Four, and Six. Child One was not available for the second follow-up assessment. Child Two was distressed by the equipment which made a slight noise during operation, Child Five shared a bedroom, with a sibling, making it impossible to ascertain which child had vocalized and Child Seven lived out of town, but in these cases the other parent was asked to record independently.

Reliability records were available for the two weeks of the second follow-up (this comprised 13-20% of recordings depending on the child's baseline length) for Children Two through Seven. Telephone

reliability records were available for an average of 24% (range 7-39%) of the records from the intervention period.

Table 10.
Reliability of frequency (freq) and duration (dur) of awakening and parental attends (attends). Parents records measured against VAR, switch-mat telephone checks and father's records

Parents records vs:	VAR		Switch mat	Telephone		Father's records	
Child N=7	Freq	Dur	Attends	Freq	Dur	Freq	Dur
1	no reliability data available						
2				88%	76%	100%	100%
3	93%	93%	93%	100%	83%		
4	100%	100%	100%	85%	85%		
5				94%	77%	86%	81%
6	93%	93%	100%	100%	100%		
7				73%	73%	100%	88%

9.3.2.1. Frequency of awakening:

1. The mean level of agreement between the VAR and parent records was 95% (range = 93 - 100%) for frequency of awakenings.
2. The mean level of agreement between both parent's records was 96% (range = 87 - 100%) for frequency of awakenings.
3. The mean level of agreement between the parents written and telephone verbal reports was 90% (range = 73 - 100%) for frequency of awakenings .

9.3.2.2. Duration of awakening:

1. The mean level of agreement between the VAR and parent records was 95% (range = 93 - 100%) for duration of awakening.
2. The mean level of agreement between both parent's records was 89% (range = 82 - 100%) for duration of awakening.
3. The mean level of agreement between the parents written and telephone verbal reports was 82% (range 73 - 100%) for duration of awakening.

9.3.2.3. Parental attends:

The mean level of agreement between the switch-mat and parents record was 97% (range =93 - 100%).

9.4. RESULTS

9.4.1. Quality of the data:

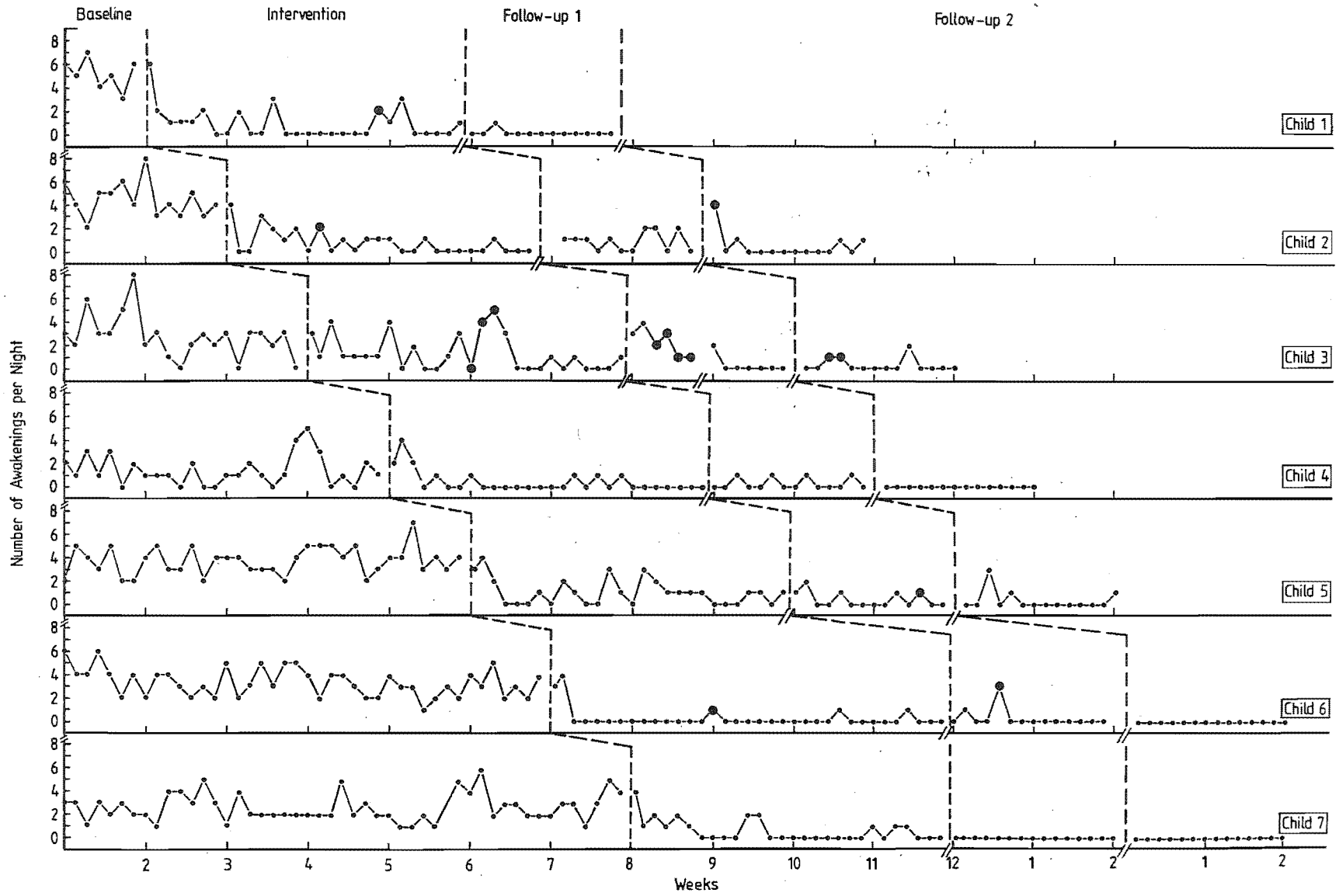
1. Illness: Nights affected by illness are denoted on Figures 4 and 5 All children except for Children Four and Seven were affected by illness, necessitating parental attention, at some point during the intervention period. In all cases other than for Child Three, illness only affected one night. In the case of Child Three illness affected three nights during the intervention period.
2. Missing data: there was no missing data during the recording period except for the second follow-up for Child One whose parents were unable to be contacted.
3. Non compliance: Non compliance, which consisted of a parent attending to a child, who was not unwell, during the intervention period, is described in Section 9.4.2.4 below.

Figure 4.

Frequency of awakenings across subjects and experimental conditions.

legend

- denotes nights of illness


Baseline
Intervention
Follow-up 1
Follow-up 2
Number of Awakenings per Night
Child 1
Child 2
Child 3
Child 4
Child 5
Child 6
Child 7
Weeks

9.4.2. Results across measures and conditions :

By the end of intervention, all subjects demonstrated improvements on all measures over baseline. These improvements were maintained on both follow-up assessment intervals.

9.4.2.1. Frequency of awakening per night.

Figure 4 presents the frequency of awakenings across subjects and experimental conditions. All subjects show decreases in the number of awakenings per night from baseline (M = 3.31; range 1.36 - 5.14) to intervention phases (M = 0.83; range 0.34 - 1.68). Responses remained at or above baseline levels for the first two or three days after the intervention began but dropped sharply thereafter. In all cases, except that of Child Three, and to a lesser extent Child Five, these decreases were marked and maintained at both first (M = 0.45; range 0.00 - 1.23) and second (M = 0.16; range 0.00 - 0.50) follow-up assessments, with corresponding decreases in variability. Mean values for Child Three and Child Five for the intervention phase (Child Three: 1.68 awakenings per night; Child Five: 1.17 awakenings per night) and and for Child Three for the follow-up assessments (1.23 and 0.29 awakenings per night respectively) were higher than those for the other subjects.

9.4.2.2. Duration of awakening per night:

Figure 5. presents the duration of awakenings across subjects and experimental conditions. All subjects showed decreases in the duration of awakening each night from baseline (M = 50.3 ; range = 9.9 - 100.7 min) to intervention phases (M = 17.1; range = 3.7 - 30.3 min). Responses remained at or above baseline levels for the first two or three days after the intervention began but dropped sharply thereafter. These improvements were maintained during both follow-up periods (M = 7.1; range = 0.0 - 29.5 min; M = 2.8; range =

Figure 5.

Duration of wakings across subjects and experimental conditions.

legend

● denotes nights of illness

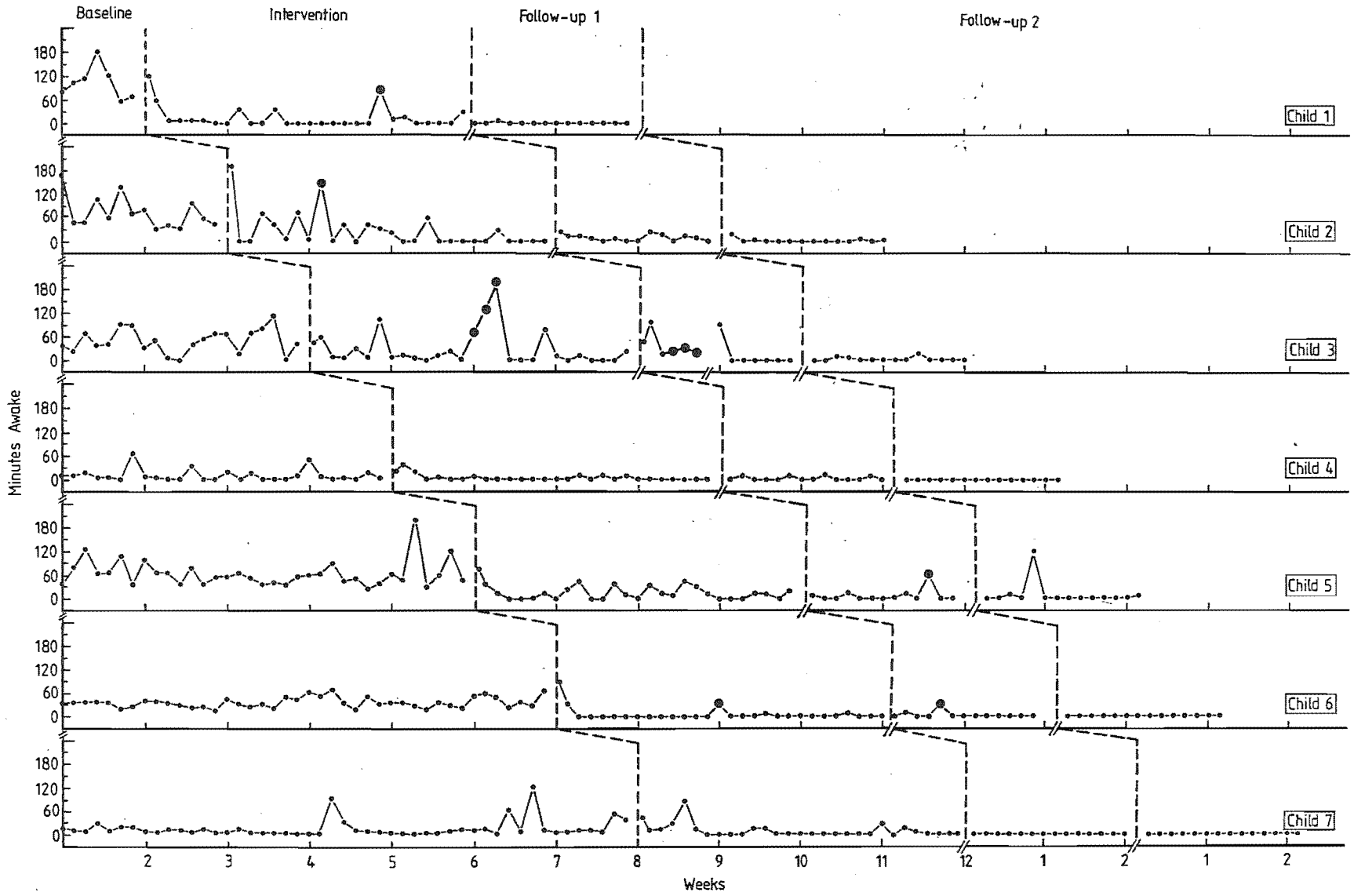
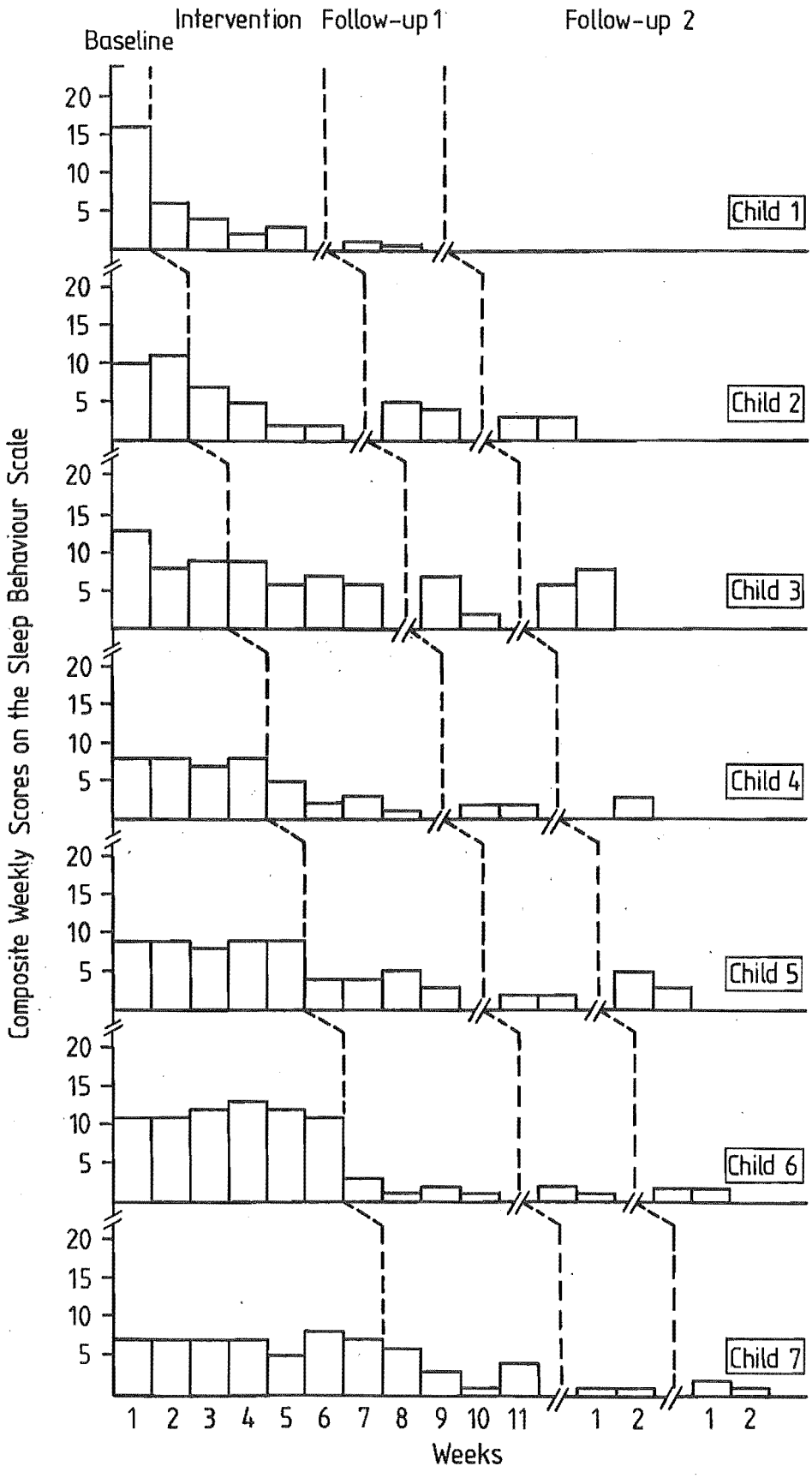

Baseline
Intervention
Follow-up 1
Follow-up 2
Minutes Awake
180
120
60
0
Child 1
Child 2
Child 3
Child 4
Child 5
Child 6
Child 7
2
3
4
5
6
7
8
9
10
11
12
1
2
1
2
Weeks

Figure 6.

Composite weekly scores on the Sleep Behaviour Scale across subjects and experimental conditions


Baseline
Intervention
Follow-up 1
Follow-up 2
Child 1
Child 2
Child 3
Child 4
Child 5
Child 6
Child 7
20
15
10
5
Composite Weekly Scores on the Sleep Behaviour Scale
1 2 3 4 5 6 7 8 9 10 11 1 2 1 2
Weeks

0.0 - 9.9 min, respectively). Children Three and Five's duration of awakening was slightly higher during the intervention period than that of the other subjects.

9.4.2.3. Sleep Behaviour Scale:

Figure 6 presents mean weekly scores on the Sleep Behaviour Scale across subjects and experimental conditions. All subjects showed decreases in their scores (baseline : $\underline{M}$ = 10.24; range = 6.9 - 16; intervention : $\underline{M}$ = 3.82; range = 1.75 - 7.0; follow-up one : $\underline{M}$ = 2.29; range = 0.5 - 4.5; follow-up two : $\underline{M}$ = 3.34; range = 1.5 - 6.5). In all cases, these improvements were marked, with the exception of Child Three who, as a result of illness showed only moderate improvement. At the second follow-up assessment, Child Three was again ill and, in addition, was being toilet-trained.

9.4.2.4. Parental attends:

Table 11 presents the percentage of awakenings attended to by parents across subjects and experimental conditions. This table does not include attends during infant illness which are denoted in Figures 4 and 5. All parents attended regularly to their children during baseline. Reported non-compliance during intervention was negligible except for Children Three and Five whose parents reported attending to them on 13% and 15% of awakenings respectively. The maintenance programme was operating during both follow-up periods. Parents response to their children during the first follow-up period was variable with the parents of Children Two and Four attending some or all of the time and the parents of all other subjects not attending at all. During the second follow-up, however, all subjects who woke were attended to every time.

Table 11.

Parental Attends across subjects and experimental conditions

Child	Baseline	Intervention (Number of Awakenings)	Follow-up 1	Follow-up 2
Child 1	100%(36)	4%(24)	0%(1)	-
Child 2	100%(62)	4%(18)	10%(10)	100%(2)
Child 3	100%(58)	13%(27)	0%(5)	100%(1)
Child 4	100%(42)	0%(12)	100%(4)	N/A(0)
Child 5	99%(122)	15%(26)	0%(4)	100%(6)
Child 6	100%(140)	0%(9)	0%(1)	N/A(0)
Child 7	100%(135)	0%(9)	N/A(0)	N/A(0)

9.5. DISCUSSION

This study demonstrated that extinction, in conjunction with stimulus control, was effective in reducing both the frequency and duration of night wakings among seven infants, as well as decreasing the other components of sleep disturbance measured by the Sleep Behaviour Scale. These improvements were maintained at three months and two years post-termination, at which points SBS scores for all children, except Child Three, fell below the criterion of 2.7 given by Richman(1985) as the average SBS score attained by children who are sleeping well. Parents' reported number of attends decreased as expected in the intervention phase. The hypothesis presented in Chapter Seven: "S1,H1: That there would be clinically significant reductions in all sleep disturbance measures in response to

the implementation of changes in the parents' behaviour" has been supported.

In the cases of Children Three and Five, where some non-compliance was reported, there appeared to be a less marked response to the intervention. The marked decrease in all sleep measures in the second follow-up and the ability of parents, at that time, to attend to their children on awakening without an increase in sleep disturbance may be a sign of how robust the effect was. These findings are consistent with those of prior studies (Jones & Verduyn, 1983; Richman et al., 1985; Rickert & Johnson, 1988; Seymour, Bayfield et al., 1983; Seymour, Brock et al., 1983, Seymour & France, 1984; Williams, 1959) and perhaps deserve particular note given advancements in the experimental methodology used such as employment of a multiple-baseline-across-subjects design, enrollment of a larger sample, prospective data collection, and long term follow-up.

The nature of and basis for the effectiveness of the intervention is not clear given that quiet wakefulness was not discriminated from sleep and both extinction and stimulus control components were included in the intervention package. As indicated earlier it seems reasonable to hypothesize the operation of physiological, maturational and temperamental factors as well as environmental causes as initiating causes of night-waking. The positive results of this study suggest that parental attention may function to maintain such awakening beyond the point where it is necessary for the infant's survival. The child awakens, then calls and the parent attends. This attending may reinforce the calling and possibly the awakening also, and becomes a setting event for the resumption of sleep. This resumption of sleep, in turn, reinforces parental attends and so completes the chain. Here when the parents ceased attending to their child, night-waking decreased rapidly, subsequently (in some cases) to

the initial increase in responding, typically observed during extinction trials.

The possible negative side effects of the intervention centre around difficulties parents have in complying with the requirements of extinction. The application of planned ignoring (extinction) has the potential to worsen night-waking if the parents inconsistently implement the procedure and, thus, place the child's night-waking on an intermittent schedule of reinforcement. This is more likely when a child is ill and parents have difficulty distinguishing illness-related behaviour, which is in need of attention, from that which is not. This difficulty was reported by the parents of Child Three. Inconsistency may also result from parental doubt regarding the acceptability of the procedure. In view of this, alternative approaches such as graduated extinction (Jones & Verduyn, 1983) and scheduled awakening (Rickert & Johnson, 1988) may sometimes be preferable. However, it is important to note that whether parental anxiety and infant distress are in fact lessened with these procedures has yet to be established. Some parents in this study were initially dubious about implementing the procedure but responded favourably to repeated explanation of the procedure and its likely benefits. In some cases, these parents commented after the programme that an intensive approach was, with hindsight, easier than a more gradual one. Referral screening may, however, have removed those parents philosophically opposed to the procedures.

It is likely that adequate implementation of the procedure could also have positive side effects over and above the direct impact on infant sleep disturbance. Pritchard and Appleton (1988) have demonstrated that mothers' emotional well-being increases as a direct result of improvements in their infants' sleep disturbance. Other examples of positive side effects might be decreases in parental anxiety, increases in parental self-efficacy with respect to child management, improved

parental sleep, improved parent-child relationships as well as improvements in the child's day-time behaviour. One example where this happened was with Child One whose severe feeding problem resolved on the second day of the intervention phase. The elimination of continued breast feeding at night appeared to lead to a marked increase in her day-time interest in solid food. Studies examining the positive and negative side effects, as well as the main events of alternative procedures are needed.

Although, in some respects this study may be more rigorous methodologically than previous studies, it has shortcomings that could be addressed through future research. The reliability measures, involving the correspondence between parent descriptions of sleep patterns during daily telephone checks and the subsequent written parents record, may only reflect the parents' memory or reading ability. Better reliability measures need to be developed. The 80 dB calibration of the VAR was chosen to avoid the high rates of false positives that resulted from lower settings. This setting risks false negatives. The switch-mat, designed to detect movement around the child's bed, particularly parental attends, was quite avoidable and a photo-electric device may be more sensitive.

Similarly, given the data collection procedures used in this study, it was not possible to ascertain whether infants continued to awaken, only decreasing their rate of calling. The possible impact of operant techniques on this aspect of infant sleep organization is an important developmental question, worthy of investigation in its own right. Another developmental question not considered in this study concerns possible differences in responsiveness to the intervention among infants of different ages. It is possible that developmental changes within the period between 6 and 24 months of age are important.

Despite the need for more research, the results of this study unequivocally show that extinction is an enduringly effective treatment for infant sleep disturbance.

CHAPTER TEN

STUDY TWO

10.1. INTRODUCTION

As described in Chapter Four the use of sedative medication with young children is widespread (Chavin & Tinson, 1980; Moesbergen, 1987; Richman 1985; Werry & Carleille, 1983) although the extent to which these preparations are used with infants per se is difficult to determine. In 1978, Rappoport et al., drew attention to the widespread use of sedative medication with children in the absence of investigation of their efficacy and effects. Kales et al. (1974) warned that over time the effectiveness of sedatives is lessened in that adaptation occurs. Sedatives can also lead to drug-withdrawal insomnia (Kales et al., 1974).

Since these concerns were raised the only investigations of the use of sedatives with children have been those by Richman (1985) and Simonoff and Stores (1987) who both investigated the efficacy of trimeprazine in managing the sleep disturbance of young children. Neither of these studies considered infants as a separate group, nor looked for adaptation to the medication or an exacerbation of sleep disturbance in response to treatment (drug-withdrawal insomnia).

Trimeprazine is a relatively long acting sedative with plasma levels in adults peaking 5 hours after oral ingestion and remaining at greater than 50% of maximum concentration up until 10 hours after ingestion (McKay, Cooper, Midha, Hall & Hawes, 1982). It is used in New Zealand in two dose rates. Vallergan (May &

Baker) has 7.5mg of trimeprazine tartrate in 5mls of syrup while Vallergan Forte contains 30mg of trimeprazine tartrate in 5 mls of syrup. Richman (1985) and Simonoff and Stores (1987) both used solutions containing in excess of 30mg of trimeprazine tartrate. Consequently the more dilute syrup, which is commonly used in doses of 7.5-15mg, has not been evaluated.

This study aimed to evaluate the effectiveness of trimeprazine in two groups of infants at the dose rate of 15mg for a three week period in children who had never received sedative medication before and at 30 mg for a 10 day period in those who had prior experience of medication. It further aimed to establish whether there was any adaptation to trimeprazine or evidence of an exacerbation of sleep disturbance under either regime. Use was made of a multiple-baseline across subjects design (Herson & Barlow, 1976) with within-subject replication, in order to observe individual, as well as group, responses to the medication.

Specific hypotheses are presented in Chapter Seven.

10.2. METHOD

10.2.1. Subjects :

The subjects were 12 infants ranging from 6 months to 27 months of age. All were of European descent and covered a range of SES levels. Other demographic information is presented in Table 12. All children presented with night waking, many had other sleep disturbances. These sleep disturbances varied across subjects as to age of onset and whether there was a precipitating factor (see Table 13). Most parents had attempted several management strategies (Table 14). They comprised all referrals to the Canterbury Sleep Project over the relevant time period with the

exception of two families who were unwilling to administer medication to their children.

Table 12.
Demographic characteristics of children

Child N=12	Age (Months)	Gender	Birth Order[1]	Father's Occupation[2]	Socioeconomic Level[3]
1	6	M	2	Milk Vendor	5
2	27[4]	M	1	Insurance Sales	2
3	9	M	1	-	-
4	7	F	2	Salesman	4
5	12	F	1	Contract Driver	5
6	11	F	1	-	-
7	26[4]	F	1	Builder	4
8	17	F	1	-	-
9	11	M	1	Sickness Beneficiary	8
10	16	M	3	-	-
11	10	M	1	Bricklayer	4
12	11	M	1	Sales Engineer	4

[1] All children were youngest children with the exception of Child Two who had one younger sibling.

[2] All mothers were full time homemakers with the exception of the mother of child One who worked on an orchard one morning a week.

[3] Elly and Irving (1972)

[4] Children older than 24 months were referred to the programme at 24 months but not seen until reported ages.

Table 13.
Sleep problems, age of onset (months) and precipitating factors reported by parents for each child.

Child N=12	Nightwaking No. per night	Sleep onset Delay	Bedtime Delay	Parents' Bed	Age at Onset	Precipitating Factor
1	2-3	-	-	-	0[1]	-
2	1-4	-	-	+	12	Walking
3	2	-	-	+	4	Hot night (fed)
4	2	-	-	-	0[1]	-
5	2-5	-	-	-	0[1]	-
6	3-6	-	+	+	3	-
7	3-4	+	-	-	9	teething
8	2	+	+	-	0[1]	-
9	2	-	-	-	5	-
10	3-4	-	+	-	5	Family stress
11	2-3	-	-	-	5	Illness, weaning
12	1-2	+	-	+	3	-

0[1] means that the child had never settled to sleep through the night.

Table 14.

Past (P) and current (C) management attempts reported by parent

Child N=12	Pacifier	Leave to cry	Feed[1]	Comfort[2]	Medication[3]	Smack	Parent's Bed	
1	-	-	C	C	-		-	-
2	-	P	C	C	occ	P	C	
3	-	P	C	C	-	-	C	
4	-	P	C	-	occ	-	-	
5	-	-	P	C	occ	-	P	
6	-	-	C	P	-	-	C	
7	-	P	C	C	P	C	-	
8	-	P	C	C	P	-	-	
9	-	-	C	C	P	-	-	
10	-	P	C	C	P	-	-	
11	C	-	P	C	P	-	-	
12	-	-	C	C	P	-	C	

[1] Includes breast and bottle feeding as well as drinks of water or orange.

[2] Includes rocking, cuddling, changing nappies, talking, singing, turning over etc.

[3] All 15mg group children had only used commercially available sedatives such as Phenergan and Pryndette sporadically.
All 30mg group children had previously received medication at a dose rate less than 30mg.

None of the children were perceived, by their parents, to have other developmental or behaviour problems. Children Two, and Seven had a history of ear infections, Child Four had had persistent upper respiratory tract infections, Child Five had an allergy to cow's milk , Child Eight had had corrective foot surgery

and wore splints (which he was adapted to) at night and Child Two had a heart murmur but was cleared by his family doctor to take part. The families of Children Nine and Ten had experienced some stressful life events since their children's birth.

10.2.2. Initial Assessment:

All parents were interviewed with their infants and assigned to one of the treatment groups, depending on whether medication had been used in the past. No child was on medication at the time of interview. Baseline lengths, which varied from 2-7 weeks, were assigned in strict order of presentation which, given the referral system to the Canterbury Sleep Project, was, in effect, random. Interview procedure followed that described in Chapter Eight. No child was excluded from this study on the basis of interview information. All recordings were made on the daily diaries described in Chapter Eight.

10.2.3. Intervention and Design:

Children were assigned to two groups of six. One group, (Children One to Six) had not received medication previously, and were administered trimeprazine tartrate 15mg/10mls and sugar syrup placebo. Children in the other group (Children Seven to Twelve) were administered trimeprazine tartrate 30mgs/10mls and sugar syrup placebo. Both these dose rates are commonly prescribed for infant sleep disturbance. A standard dose rate within the groups was considered acceptable given the small difference in body weight between infants in this age group.

Both groups had an A-A1-B-A1-B-A (Hersen & Barlow, 1976) multiple-baseline-across-subjects-design, with A1(placebo) and B (active drug) comprising a period of full dose followed by a withholding period of gradual withdrawal (2mls reduction every

second night over 7 nights). A summary of this design is given in Table 15.

Table 15.
Experimental design for Study Two.

15mg Group

A (Baseline 1)	A1 (Placebo 1)	B (Active 1)	A1 (Placebo 2)	B (Active)	A (Baseline 2)
Baseline 14-49 days	Placebo 21 days 7 days Reducing	Active 21 days 7 days Reducing	Placebo 21 days 7 days Reducing	Active 21 days 7 days Reducing	Baseline 14 days

30mg Group

A (Baseline 1)	A1 (Placebo 1)	B (Active 1)	A1 (Placebo 2)	B (Active 2)	A (Baseline 2)
Baseline 14-49 days	Placebo 10 days 7 days Reducing	Active 10 days 7 days Reducing	Placebo 10 days 7 days Reducing	Active 10 days 7 days Reducing	Baseline 14 days

The medication was gradually withdrawn between phases rather than withdrawn abruptly. This was done in order to avoid rebounds resulting in drug-withdrawal insomnia as far as was possible.

Length of administration varied between the two groups with the 15mg group having a three week period of trimeprazine/placebo prior to one week withdrawal and the 30mg group having only a ten day period.

The reasons for this were:

1. Ethical, in that it was considered desirable to have the infants on the higher dose for as short a time as possible.
2. Experimental, in that evaluation was of a higher dose over a short period with a group of infants who had experienced previous drug treatment and a lower dose over a longer period in a group of infants who had not experienced previous drug treatment.

10.2.4. Procedure:

An explanation was given to parents as to the rationale for the study, that is, that trimeprazine was a mild sedative widely prescribed but that its pattern of effectiveness was not fully known. They were told their children would be administered one of two widely used dose rates and would alternate between receiving active medication and receiving a sugar syrup. The need for double blind investigations was explained and they were assured that although the principal investigator and her research assistant did not know which medication was in use at a particular time, the medical practitioner involved and another senior staff member did know and should be consulted if any concern should arise. At this point the parents' agreement to take part was sought.

Parents were instructed to administer the medication according to the presence/absence of a difficulty with sleep onset or bedtime delay. Children who regularly settled straight to sleep were administered the medication at bedtime, children with sleep onset or bedtime delay were administered the medication 20 minutes before bedtime.

Administration regimes were clarified with parents who were asked to write bottle changes on diaries as a compliance check. Bottles were delivered a few days prior to being required. Compliance was checked verbally at these times too.

Once baseline recordings were complete the families received their medication from the medical practitioner involved. Bottles were held at the university and supplied one at a time. Parents received detailed instructions regarding administration and withdrawal of medication, continued recordings and what to do in the event of problems or concerns. These were formalized in the form of a contract (see Appendix E). Parents were assured of continued help in the event of their child's sleep disturbance remaining unimproved at the completion of the course of medication.

Other than being given instructions regarding medication administration, parents were given no management advice and were instructed to continue handling any awakenings as before.

At the completion of the final baseline check parents were offered a behavioural programme, if necessary, to manage their child's sleep disturbance.

10.3. MEASURES:

Measures were as described in Chapter Eight with the addition of the following:

10.3.1. Sleep Onset Delay:

This was measured separately from the SBS in this study because, it was possible that sleep onset delay may be affected directly by the medication even if other measures were not. Sleep

onset delay was defined as the time from when the child was placed in bed until silence enabled the parents to assume the child was asleep.

10.3.2. Number of Nights Slept Through:

This was measured separately from frequency and duration of awakening as it was seen as the ultimate test of the medication's effectiveness. A child was considered to have slept through the night if there were no awakenings from sleep onset until a predetermined time in the morning (usually 6 a.m.).

10.3.3. Elapsed Time to First Awakening:

It was decided to consider this measure after the data were collected. It was apparent that there was a large variability in response to the medication in that awakening continued to occur in many cases even during treatment with the medication. Elapsed time to first awakening was measured in order to ascertain whether the child's pattern of awakening was affected by the medication on the nights on which awakening occurred. It was hypothesized that trimeprazine may lead to a delay in awakening even were awakening not eliminated. Given that adult serum levels of trimeprazine peak at 5 hours after ingestion and decrease to about 50% of maximum concentrations at 10 hours (McKay et al., 1982) it was considered possible that the children's serum levels could have dropped to sub-therapeutic levels before the child had completed his or her night's sleep.

Elapsed time to first awakening was the time from sleep onset until the first awakening was recorded by the parents. It was measured in two ways, one which included the nights that the children slept through in each condition and another where these nights were excluded.

10.3.4. Clinical Outcome:

Clinical outcome was measured, for response to the medication by comparing SBS scores from both active medication conditions with Richman's (1985) mean score of 2.7, attained on the SBS by children who were sleeping well. Clinical outcome was measured for continued response after the medication had ceased, by using the same SBS criterion score of 2.7 for comparison with scores attained during the second baseline condition.

10.3.5. Parental Satisfaction:

Parental satisfaction was measured by determining the parents' willingness to continue with the medication and by discovering whether they wished to accept any other help in modifying their children's sleep disturbance.

10.3.6. Drug Adaptation and Drug-Withdrawal Insomnia:

Drug adaptation was measured by consideration of the trend within each active medication condition and by comparing the response to the second active medication phase to the response to the first active medication phase for each subject. A trend towards more sleep disturbance, that is, a higher frequency of awakening, longer duration of awakening and longer sleep onset delay, over the time the medication was administered, would be considered evidence that adaptation had occurred, as would more sleep disturbance in the second active medication condition compared with the first.

Drug-withdrawal insomnia was measured by consideration of the infant's response during the second placebo and second baseline conditions. An increase in sleep disturbance during these

phases, over the levels apparent during the first baseline condition would be considered evidence that drug-withdrawal insomnia had occurred.

10.3.7. Reliability:

The results of reliability measures for this study are presented in Table 16. Reliability was available for a mean 17% (range 6-36%) of nights of parental recording.

Table 16.
Reliability of parents records of frequency and duration of awakening with VAR and Fathers' reliability

Child	Frequency	Duration	Ratio of records checked
1	73%	93%	47/130nights
2[1]	90%	88%	26/130nights
3[1]	100%	90%	14/130nights
4	88%	55%	29/130nights
5	77%	79%	16/130nights
6	70%	91%	14/130nights
7[1]	42%	74%	7/96nights
8	93%	78%	23/96nights
9	97%	76%	19/96nights
10	54%	100%	8/96nights
11	87%	97%	21/96nights
12[1]	92%	85%	6/96nights

[1]Fathers' reliability.

10.3.7.1. Frequency of awakenings:

1. VAR Reliabilities: The mean level of agreement between the VAR and parents' records was 80% (range 70-97%).

2. Father's Reliability: The mean level of agreement between both parent's records was 81% (range 42-100%).

10.3.7.2. Duration of awakenings:

1. VAR Reliabilities: The mean level of agreement between the VAR and parents' records was 84% (range 55-100%).

2. Father's Reliability: The mean level of agreement between both parent's records was 84% (range 74-90%)

10.4. RESULTS 15MG GROUP:

Where data is presented parenthetically within the text the following terms have been used to denote the phases:
"Baseline 1" refers to the first baseline condition.
"Placebo 1" refers to the first placebo condition.
"Active 1" refers to the first active medication condition.
"Placebo 2" refers to the second placebo condition.
"Active 2" refers to the second active medication condition.
"Baseline 2" refers to the second baseline condition.

10.4.1. Quality of the data:

1. Intervention delay: Child One had a 1 week delay and Child Three had a three day delay in starting the first intervention condition because of either medical practitioner unavailability (Child One) or child illness (Child Three). A corresponding

amount of time was removed from the beginning of the reported baselines in order that baselines remain consecutive with intervention.

2. Missing data: Child Six had nine days missing data owing to her mother's unanticipated hospitalization.

3. Illness: Nights when the children were ill, other than during the drug withdrawal phases, are denoted on Figures 7, 8 and 9. All children had at least one night of illness during the period of data collection but no subject was ill for more than 4% of nights.

Intervention for Child Five had to be delayed for three weeks after the beginning of the first placebo condition. This was due to a marked reaction in the child diagnosed by a medical practitioner as an allergy to the tartrate dye in the placebo. The delay was necessary to allow the child to recover from her symptoms and to enable the pharmacist to devise a placebo and active medication based on vegetable dyes. The parents continued to monitor her health and on the first day of the first active medication condition removed all food, such as cheese, containing tartrate dye from her diet.

4. Non-compliance: Nights on which parents were non-compliant with the programme are denoted in Figures 7, 8 and 9. Non-compliance was deemed to have occurred under any of the following conditions :

a) When one of the study medications was given during a baseline or alternative medication condition (this did not occur in this group).

b) When other sedative medications were given at any time during the study. Child Four was given another sedative on one night during the first baseline condition and brandy on one night of the second medication condition.

c) When medication was not given during appropriate conditions. Child One was not given the second placebo on three nights as he was on antibiotics and his parents considered it unwise. Child Three was not given placebo on two nights and active medication on three nights when he was ill as his parents thought it unwise. Child Four was not given active medication for the first night of the first active condition as her parents misunderstood instructions.

d) When child management techniques were changed at any time during data collection. Child Four's parents decided to institute an unauthorized extinction programme on the second night of the second baseline condition. This continued for eight nights , there was a reversal on the ninth night and the extinction procedure was successfully completed thereafter. Child Six was placed into bed earlier during the first placebo condition than during the first baseline condition and underwent an unauthorized extinction programme for the last two nights of the medication withdrawal condition which followed the first active medication condition, when her mother was suddenly hospitalized and her father cared for her. This continued throughout the second placebo condition until there was a reversal on her mother's return two days prior to the second active medication condition.

Parents were encouraged to be honest in recording illness, non-compliance and other problems. Nights affected by these events are denoted on the appropriate figures and were removed from SBS compilations. Where SBS weekly mean scores could not be prorated from at least 4 nights data they were considered invalid and not compiled. This applied to 5 weeks for Child Six and 1 week for Child Four.

Table 17

Means and ranges for each child across phases and measures

Legend

S.O.D. Sleep onset delay
SBS Sleep Behaviour Scale
%T/N Percentage of nights slept through.

Child 1

Measure	A	A1	B	A1	B	A
Frequency	1.6 0-3	2.0 1-3	.4 0-2	.8 0-2	.8 0-2	1.3 0-3
Duration	16 0-30	16 10-30	10 0-90	49 0-270	27 0-135	25 0-85
S.O.D.	0	0	0	0	0	0
SBS	7 7-8	8 8-8	4.6 3-6	8.5 8-9	7 5-8	8.5 7-8
%T/N	7%	0%	52%	38%	39%	14%

Child 2

Measure	A	A1	B	A1	B	A
Frequency	.7 0-3	.5 0-2	.4 0-3	.8 0-2	.4 0-4	.4 0-2
Duration	10 0-77	11 0-95	16 0-150	16 0-90	4 0-30	7 0-90
S.O.D.	26 5-60	33 10-90	21 0-60	19 0-45	16 5-80	5 5-40
SBS	8.6 3-12	9 8-10	5.3 2-10	10.6 10-11	5 3-7	6.6 4-9
%T/N	61%	61%	86%	43%	81%	71%

Child 3

Measure	A	A1	B	A1	B	A
Frequency	1.1 0-2	1.4 1-2	.4 0-1	.8 0-1	.1 0-1	.6 0-1
Duration	33 0-90	38 0-95	10 0-25	23 0-80	2 0-15	9 0-15
S.O.D.	1 0-20	5 0-90	0	3 0-60	0	0
SBS	7.5 3-10	8.6 8-10	5.3 4-9	8.3 8-9	2 0-3	5 4-6
%T/N	48%	10%	52%	28%	66%	43%

Child 4

Measure	A	A1	B	A1	B	A
Frequency	1.7 1-3	1.7 0-4	2.3 1-4	2.6 1-5	2.1 1-6	1.5 1-5
Duration	45 15-150	22 10-45	33 10-145	49 10-90	36 10-130	40 0-45
S.O.D.	18 0-135	18 0-95	20 0-130	9 0-95	16 0-120	8 0-90
SBS	10.4 8-12	10.3 8-12	10 8-12	10.3 9-11	10 10-10	13 13-13
%T/N	0%	5%	0%	0%	0%	0%

Child 5

Measure	A	A1	B	A1	B	A
Frequency	1.1 0-6	1.3 0-4	.6 0-3	.6 0-2	.6 0-2	.4 0-2
Duration	25 0-220	35 0-150	11 0-90	9 0-25	12 0-120	5 0-15
S.O.D.	0	5 0-95	0	0	0	0
SBS	7.2 6-8	8.3 7-9	4.6 4-5	5.6 4-7	4.3 0-7	4 4-4
%T/N	36%	24%	62%	52%	57%	69%

Child 6

Measure	A	A1	B	A1	B	A
Frequency	3.4 2-5	2.6 1-6	1.5 0-3	N.D.	.1 0-1	.4 0-1
Duration	47 0-225	64 5-225	20 0-175	N.D	10 0-90	17 0-90
S.O.D.	0	0	0	0	0	0
SBS	16.4 15-17	14 13-16	11.3 6-15	N.D.	5.6 4-9	11 10-12
%T/N	2%	0%	21%	N.D.	95%	64%

Child 7

Measure	A	A1	B	A1	B	A
Frequency	1.6 0-3	3.1 1-5	.8 0-2	3.0 1-5	.7 0-2	1.3 0-5
Duration	12 0-45	11 2-37	5 0-15	22 6-60	5 0-40	6 0-27
S.O.D.	16 0-60	21 0-60	3 0-30	8.6 0-30	4 0-40	4 0-60
SBS	13.5 12-15	12 11-13	5 4-5	11.5 13-10	3 1-5	7 4-10
% T/N	14%	0%	50%	0%	60%	27%

Child 8

Measure	A	A1	B	A1	B	A
Frequency	1.6 0-4	2.8 1-4	1.4 0-2	4.0 2-6	2.4 1-3	3.3 1-6
Duration	25 0-98	33 10-70	8 0-15	27 15-50	15 10-25	34 20-95
S.O.D.	5 0-25	10 0-30	0	10 0-30	15 10-20	19 0-45
SBS	12 12-12	11.5 9-13	6 6-6	12 11-13	9 10-8	13.5 13-14
% T/N	5%	0%	10%	0%	0%	0%

Child 9

Measure	A	A1	B	A1	B	A
Frequency	1.4 0-3	1.4 1-2	.5 0-1	1.9 1-3	.1 0-1	.9 0-3
Duration	18 0-110	30 15-70	6 0-15	42 10-80	12 0-120	18 0-60
S.O.D.	2 0-15	3 0-30	1 0-10	5 0-15	2 0-10	21 0-120
SBS	11 10-11	11 9-13	5 4-6	10.5 10-11	2.5 0-5	10.5 10-11
% T/N	7%	0%	50%	0%	90%	35%

Child 10

Measure	A	A1	B	A1	B	A
Frequency	2.4 1-5	2.7 1-4	1.1 0-4	1.7 1-3	1.0 0-2	3.1 0-6
Duration	8.4 2-30	5.4 2-8	2.2 0-4	44.4 2-122	2.0 0-4	6.3 0-12
S.O.D.	0	0	0	0	0	0
SBS	8 8-8	8.5 8-9	6 5-7	12.5 11-14	6 5-7	10 10-10
% T/N	0	0	20	0	30	8

Child 11

Measure	A	A1	B	A1	B	A
Frequency	2.1 0-5	2.2 0-4	.1 0-1	4.3 1-8	.9 0-5	4 2-5
Duration	6.3 0-38	4.4 0-8	.2 0-2	8.4 2-16	1.7 0-10	8 4-10
S.O.D.	9 0-45	21 0-105	2 0-15	0	1 0-10	12 0-60
SBS	8 7-9	9 8-10	2 2-2	8.5 8-9	5.5 5-6	7 7-7
% T/N	17	10	90	0	50	0

Child 12

Measure	A	A1	B	A1	B	A
Frequency	1.8 0-7	2.3 0-4	.4 0-1	.9 0-2	.3 0-1	.7 0-2
Duration	26 0-70	33 0-60	6.0 0-15	10 0-25	13 0-90	18 0-65
S.O.D.	12 0-105	2 0-10	5 0-15	5 0-10	0 0	1 0-10
SBS	9.5 8-12	9 9-9	4.5 4-5	6.5 5-8	4 3-5	6.5 6-7
% T/N	10	10	60	20	70	29

10.4.2. Results Across Children:

Means and ranges for each child and each phase across each measure are presented in Table 17.

10.4.2.1. Child One:

Child One one presented with regular but brief, night waking. He evidenced no sleep onset delay at any stage of the study. There was no evidence of a placebo response. This subject demonstrated a response to the first medication trial across all measures, this response was most marked when the number of nights he slept through is considered (active 1, 52%, cf., 7%, baseline 1). There was, however a marked recovery of his sleep disturbance, accompanied by an increase in the duration of awakening, starting the last night of the first active medication condition and continuing during the second placebo condition with very little response to the second active medication trial. SBS scores reflect these observations and continue, during the second baseline condition, at the levels recorded during the first baseline condition.

10.4.2.2. Child Two:

Child Two presented with irregular waking which was, nonetheless, often of considerable duration when it occurred. His most important presenting problem was sleep onset delay which occurred every night, often for protracted periods .

There was no evidence of a placebo response in either placebo condition. This subject was more likely to sleep through the night during both medication trials (active 1, 86% ,active 2 , 81% cf baseline 1, 51%), but showed more response to the second active medication condition than the first active medication condition in

that duration of awakening and sleep onset delay showed a decrease in the second medication condition whereas during the first medication trial duration of awakening in fact increased. There was, however, a response to both active medication conditions when SBS composite scores were considered. Although there was an increase in nights slept through (71%) and a mean decrease in night waking, duration of awakening and sleep onset delay during the second baseline condition, there was considerable variation and SBS scores showed an increase in sleep disturbance in this phase compared to the first baseline condition.

10.4.2.3. Child Three:

Child Three presented with regular waking of considerable duration which improved, uncharacteristically, for four days during the second week of the first baseline condition. This improvement was not maintained. Sleep onset delay seldom occurred.

This child demonstrated no placebo response although sleep disturbance in the second placebo condition was slightly less than that in the first placebo condition. There was a slight response to the first active medication condition. His response to the second active medication condition was more marked. These results were clearer when the composite SBS scores were considered. Scores for the second baseline condition did not recover to the levels measured during the first baseline condition.

10.4.2.4. Child Four:

Child Four presented with consistent night waking of protracted duration as well as regular sleep onset delay. She did not demonstrate a placebo effect and in fact her sleep disturbance

was exacerbated, across all measures, during the second placebo condition and at the beginning of the second baseline condition with the exception of sleep onset delay which decreased during the second placebo condition. During the first active medication condition there was a slight improvement in sleep onset delay that is not reflected in means and ranges, in that this subject settled to sleep without a delay on a number of nights. Otherwise, this subject showed very little change in any measures across all conditions. This subject did not sleep through the night under any condition during the study. SBS scores showed no change in any condition throughout the study. The second baseline measures could not be validly considered owing to parental non-compliance. Usable recordings made on the first night, however, indicates that this subject's sleep disturbance continued at at least the levels of the first baseline condition.

10.4.2.5. Child Five:

Child Five presented with consistent waking of considerable duration. Sleep onset delay was not a problem.

There was no evidence of a placebo response except during the second placebo condition where a slight improvement in duration of awakening carried over from the first active medication condition. There was a marked improvement in sleep disturbance in both active medication conditions although this appears to be more marked in the first week of the second active medication condition. This improvement is reflected in the number of nights slept through. SBS scores indicated improvement in both active medication conditions as well as the second placebo condition. There was improvement in all measures during the second baseline which does not reach the levels of sleep disturbance recorded in the first baseline.

10.4.2.6. Child Six:

Child Six presented with consistent waking of protracted, but highly variable duration. Sleep onset delay was not a problem. There was no evidence of a placebo response during the first placebo condition and the validity of the second placebo measures was questionable because it was affected by parental non-compliance throughout the period. There was a slight response across all measures in the first active medication condition and a marked response in the second active medication phase, although this may have been influenced by the previous parental non-compliance. This subject only slept regularly through the night during active medication phases (active 1, 21%; active 2 ,95% cf., baseline 1, 2%). SBS scores remained relatively high throughout the study. These scores were contributed to by the length of awakening when it occurred, being in the parent's bed and bed-time delay. The second baseline condition indicated a recovery of sleep disturbance although this did not return to the levels of baseline one.

10.4.3. Results Across Measures:

10.4.3.1. Frequency of awakening per night:

Figure 7 presents the frequency of awakening across children and conditions.

The results of all subjects were marked by considerable variability in that there was considerable overlap between the ranges for the active medication conditions and the baseline and placebo measures. For most subjects the placebo conditions gave results which were approximately equal to the first baseline condition on this measure (baseline 1, M = 1.6, range.7-3.4; placebo 1, M = 1.6, range 15-2.6; placebo 2, M = 1.1, range, 6-2.6).

Figure 7

15 mg Group

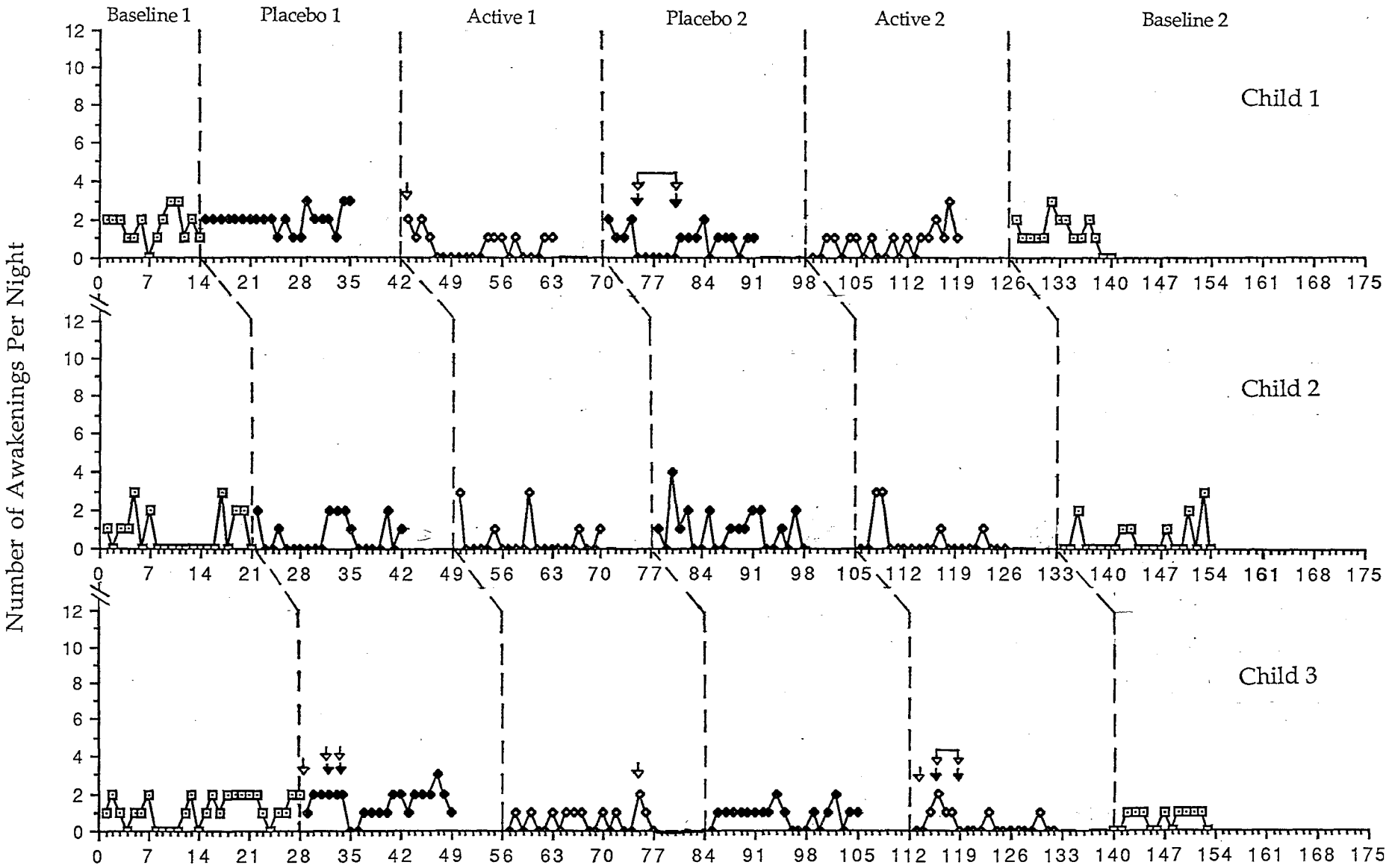
Frequency of awakening across children and conditions

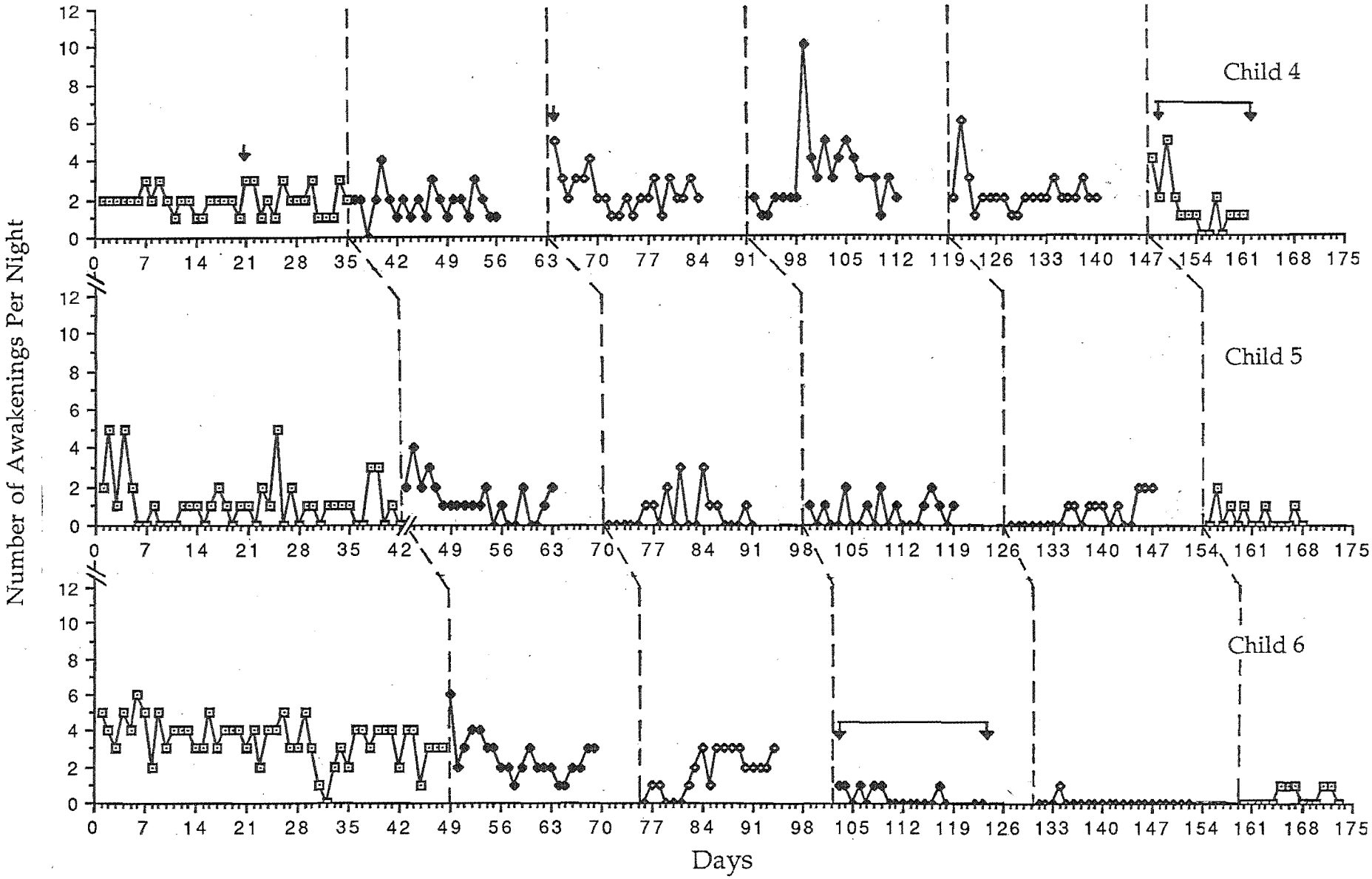
Legend

- baseline
- placebo
- active

Key

- ↓ denotes nights of illness
- ↓ denotes non-compliance


Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 1
Child 2
Child 3
Number of Awakenings Per Night
0
2
4
6
8
10
12
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175


Number of Awakenings Per Night
Child 4
Child 5
Child 6
Days
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175
0 2 4 6 8 10 12

There was a decrease in frequency of awakenings during both active medication conditions (active 1, M = 0.9, range, 4-2.25; active 2, M = 0.7, range .1-2.1). Overall there was slightly less awakening during the second than the first baseline condition (baseline 2, M = 1, range, 4-2.6) although this result was not a trend in that it varied markedly with individual subjects.

10.4.3.2. Duration of awakening per night:

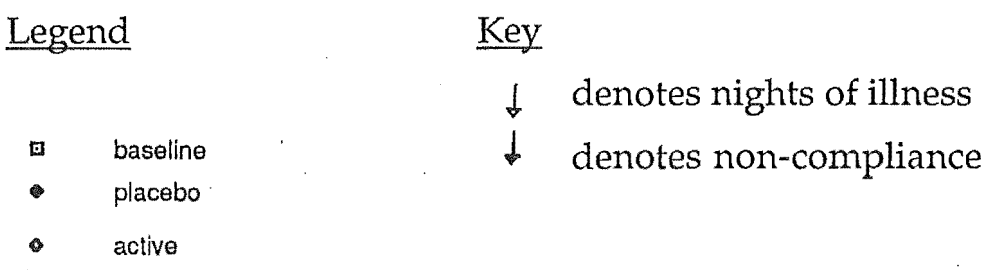
Figure 8 shows duration of awakening across children and conditions.

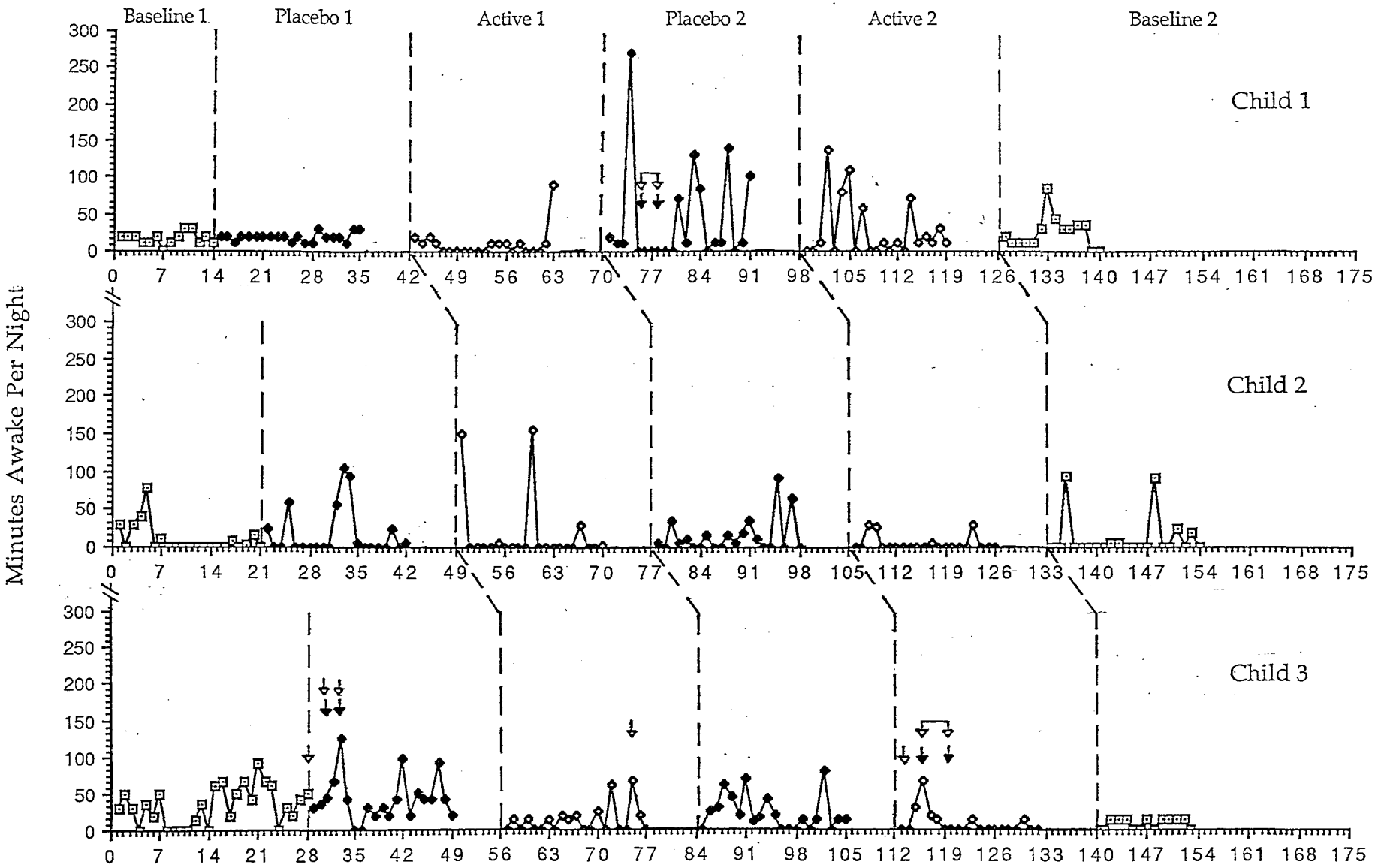
There was considerable variability and overlap of results across conditions on this measure also. Overall there was very little difference between both placebo conditions and the first baseline condition on this measure (baseline 1, M = 29.5 min, range, 10.3-47 min; placebo 1, M = 31.1 min, range 11.3-64 min; placebo 2, M = 28.4 min, range, 8.5-48.8 min) although some subjects evidenced an increase in duration of awakening during the first placebo condition. There was a decrease in duration of awakening each night during both active medication conditions (active 1, M = 16.5 min, range, 11.4-33min; active 2, M = 15.1min, range, 1.8-35.7 min). The second baseline condition was markedly lower than the first baseline condition on this measure (baseline 2, M = 17 min, range, 5-39.5 min) although this result was not a visible trend in that it varied between subjects.

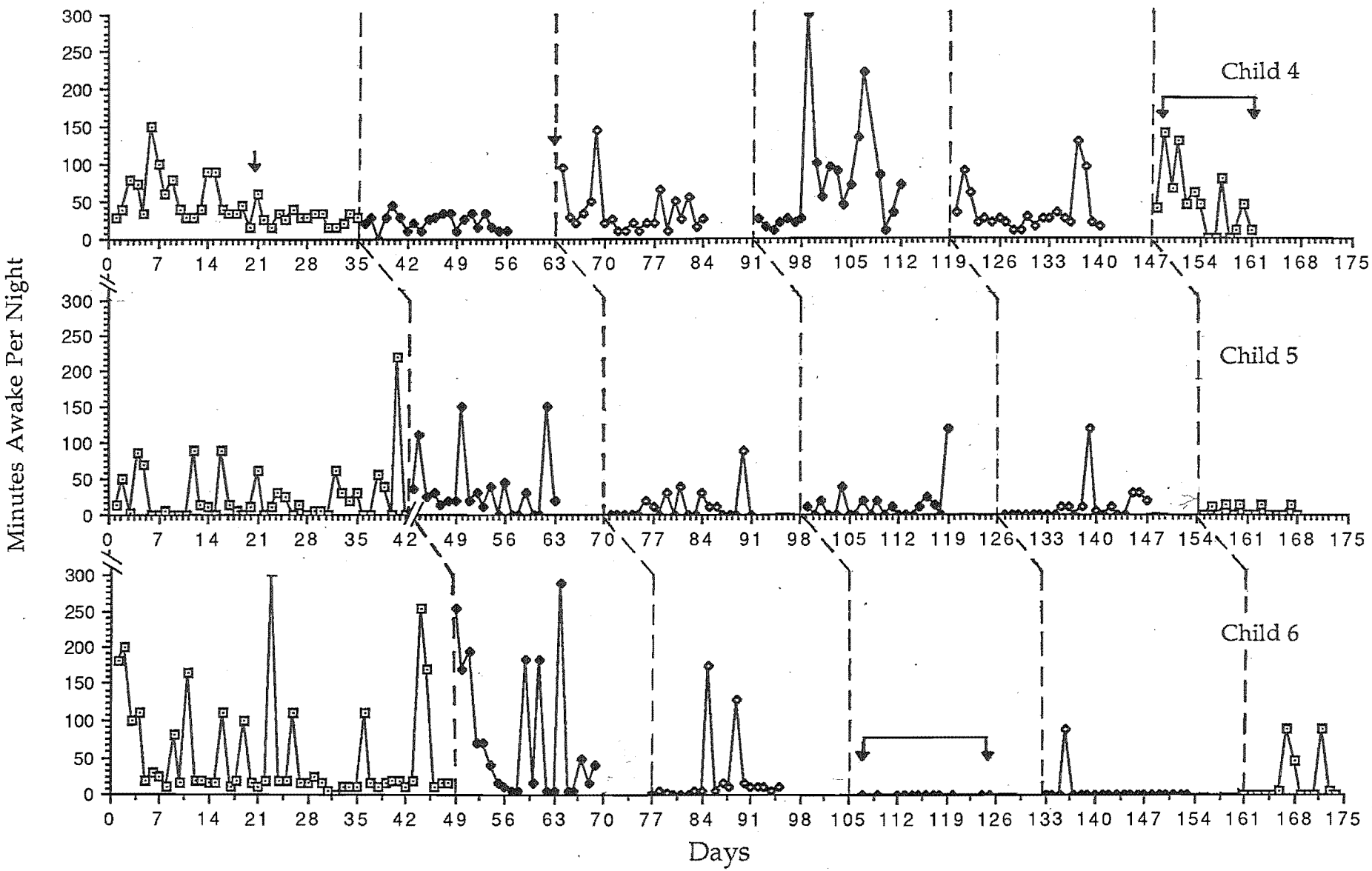
Figure 8

15 mg Group

Duration of awakening across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 1
Child 2
Child 3
Minutes Awake Per Night
0
50
100
150
200
250
300
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175


Minutes Awake Per Night
Child 4
Child 5
Child 6
Days
0
50
100
150
200
250
300
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175

10.4.3.3. Sleep onset delay:

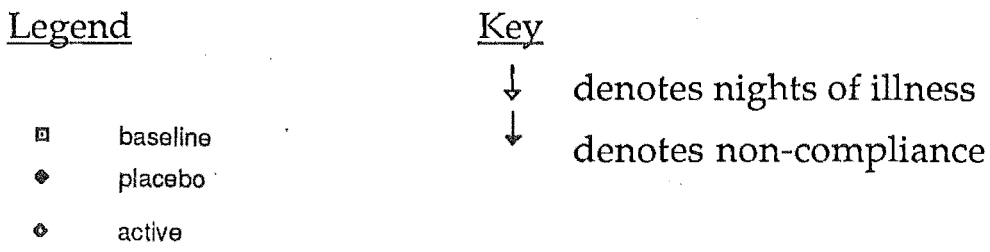
Figure 9 shows sleep onset delay across children and conditions.

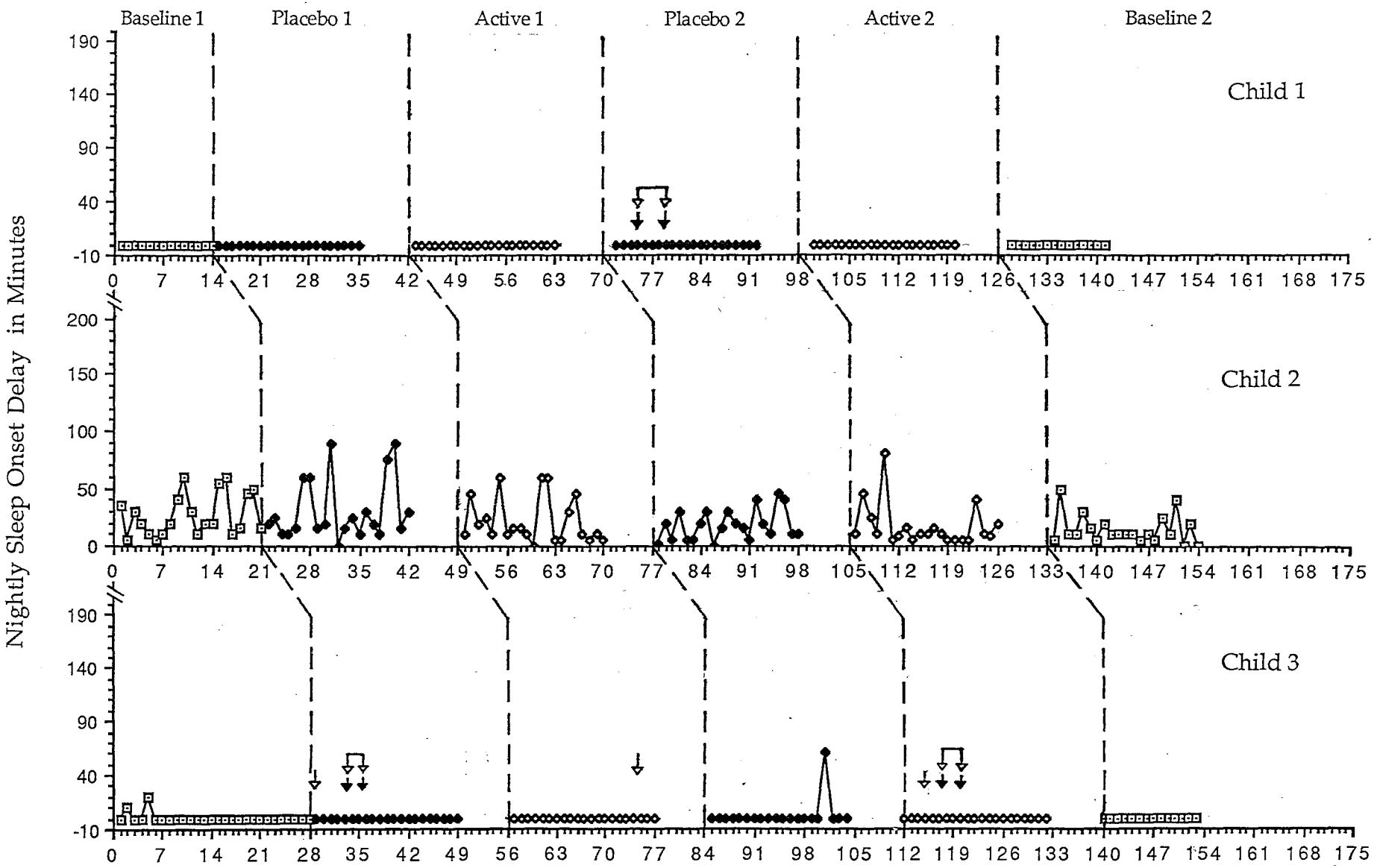
There was considerable variability and overlap in the results for each condition for the two subjects who presented with sleep onset delay as a problem, especially during the baseline and first placebo condition. There was very little overall difference between the first baseline and both placebo conditions on this measure (baseline 1, M = 7.7 min, range, 0-27 min; placebo 1, M = 6.1, range, 0-21.2 min; placebo 2, M = 6.9 min, range, 0-20.7 min) although greater variability in results during the first placebo condition is evident from inspection of the graph. There was very little apparent response to the first active medication condition (M = 6.7 min, range, 0-21.6 min) but response to the second active medication condition was more marked (M = 5.3min, range 0-16.4 min) the second baseline condition showed continued improvement (M = 4min, range, 0-14 min) particularly for Child Five but may have reflected the non-compliance of this child's parents during this phase.

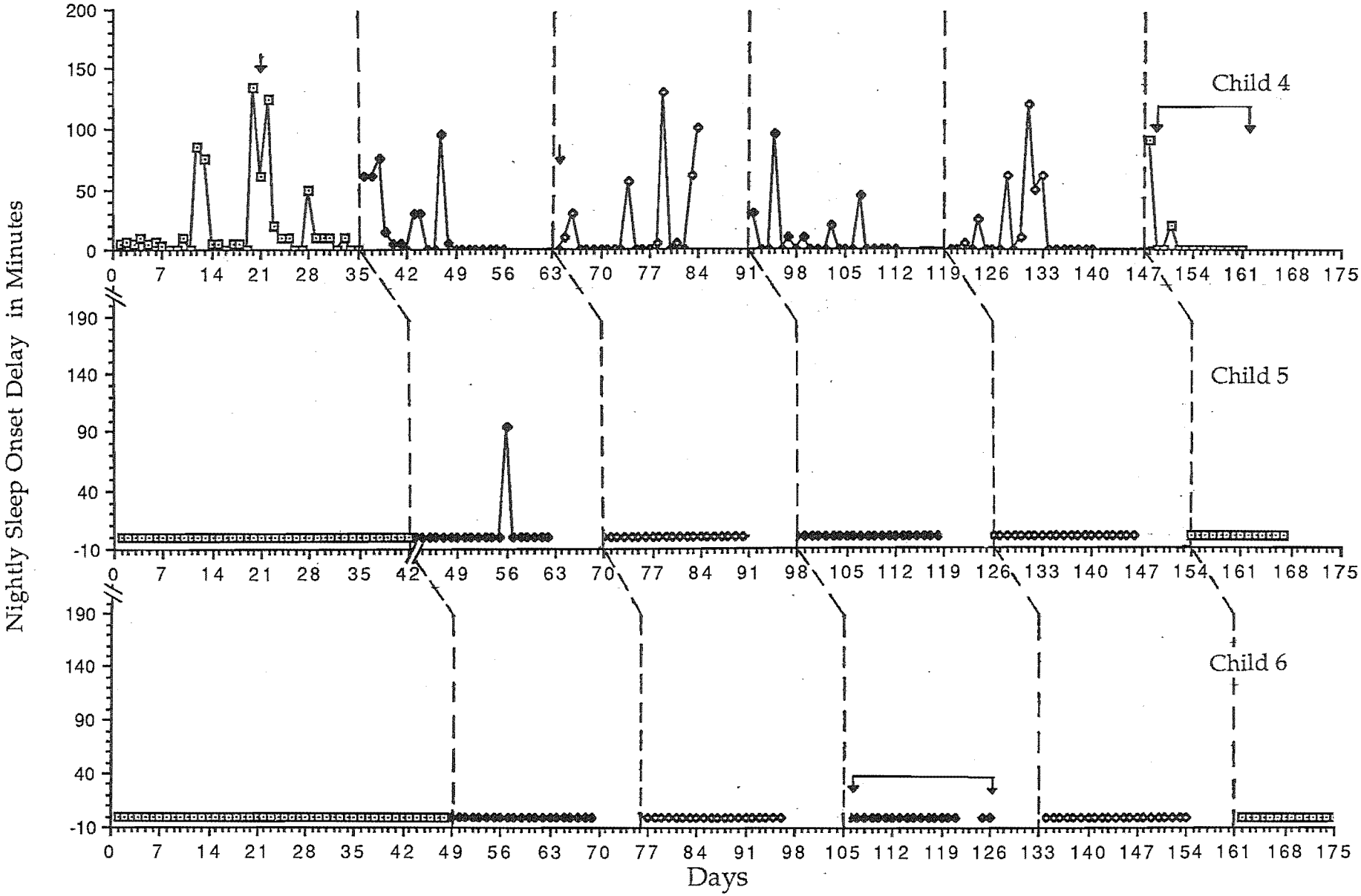
Figure 9

15 mg Group

Sleep onset delay across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 1
Child 2
Child 3
Nightly Sleep Onset Delay in Minutes
190
140
90
40
-10
200
150
100
50
0
7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175


Nightly Sleep Onset Delay in Minutes
Child 4
Child 5
Child 6
Days
200
150
100
50
0
190
140
90
40
-10
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175

10.4.3.4. Percent of nights slept through without awakening.

The number of nights slept through across children and conditions can be seen in both Figure 7 and Figure 8.

There was evidence of a decrease in nights slept through (representing an increase in sleep disturbance) during the first placebo, but not the second placebo condition compared to the first baseline condition (baseline 1 M = 25.6%, range, 0%-61%; placebo 1 M = 16%, range, 0%-61 %; placebo 2 M = 32.2%, range, 0%-62%).

This measure was the one which responded most sensitively to the medication with an increase in nights slept through during both active medication conditions (active 1, M = 44%, range, 0%-86%; active 2, M = 56.1%, range, 0%-95%). This improvement continued into the second baseline condition (M = 43.5, range, 0%-71%) but, as with all other measures was dependent on individual responses during this phase.

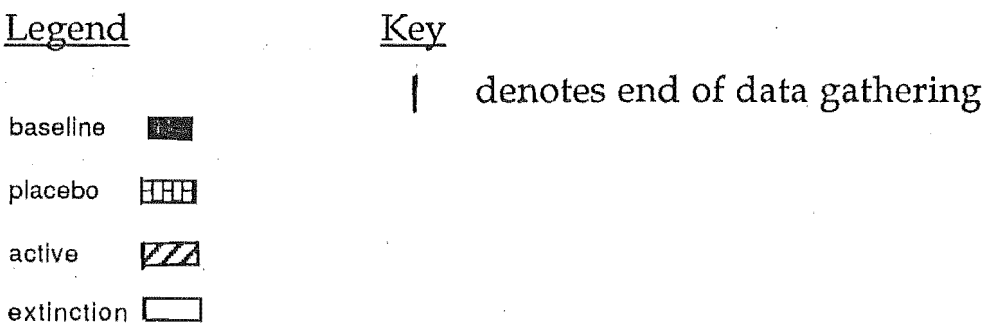
10.4.3.5. Sleep Behaviour Scale scores:

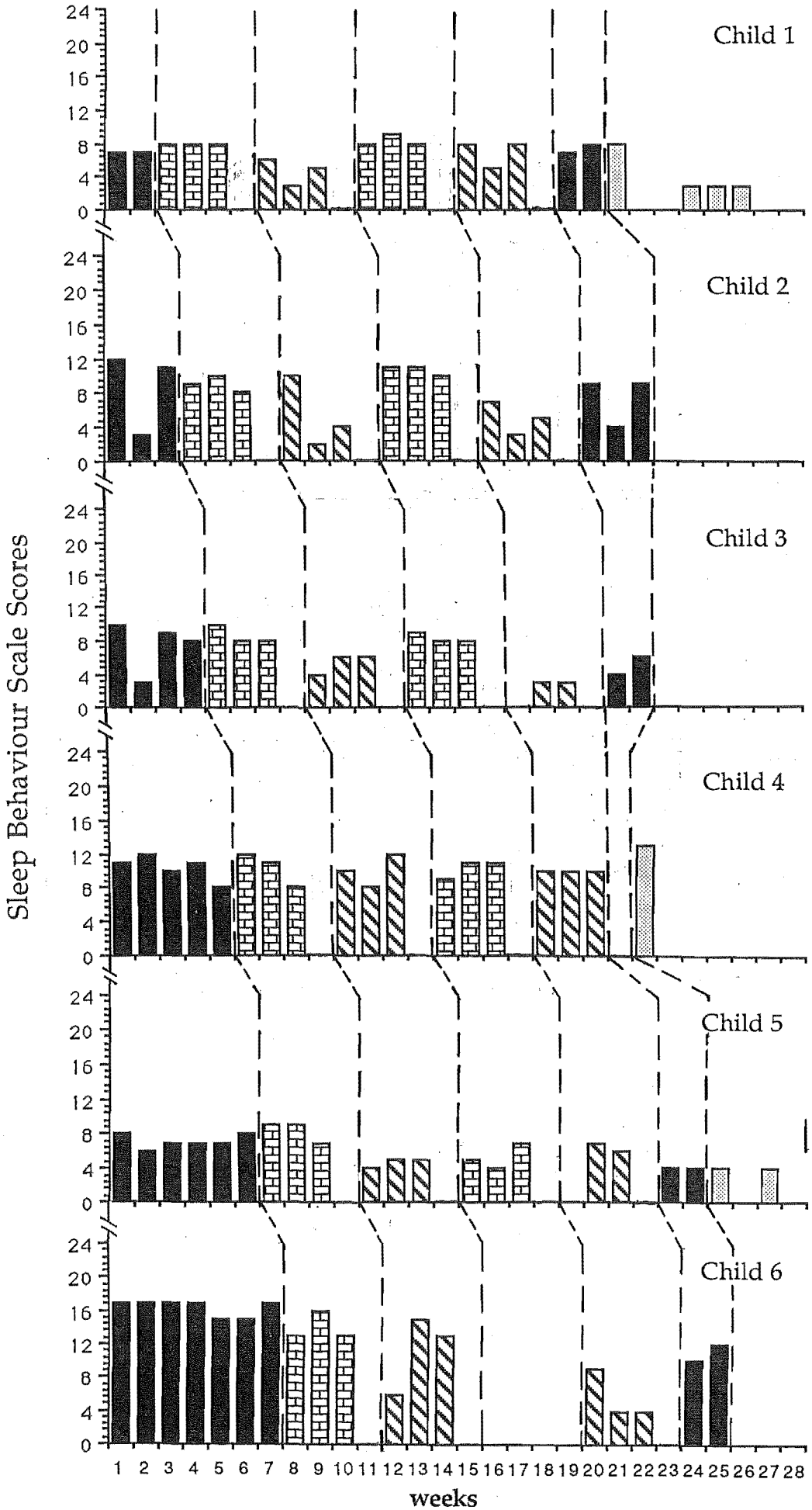
SBS scores are shown in Figure 10. There was very little difference between both placebo conditions and the first baseline condition on this measure (baseline 1, M = 9.5, range, 7-16.4; placebo 1, M = 9.7, range, 8-14; placebo 2, M = 8.6, range, 5.3-10.6). Both active medication conditions showed a decrease in SBS scores (active 1, M = 6.8, range, 4.7-11.3; active 2 M = 5.7, range, 2-10). The second baseline condition showed an overall slight decrease in SBS scores compared to the first baseline condition (baseline 2, M = 7, range, 4-11) which was evident for most subjects.

Figure 10

15 mg Group

Sleep Behaviour Scale scores across children and conditions




Child 1
Child 2
Child 3
Child 4
Child 5
Child 6
Sleep Behaviour Scale Scores
0
4
8
12
16
20
24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
weeks

10.4.3.6. Elapsed time to first awakening.

Figure 11 shows elapsed time to first awakening, including nights where the child slept through, across conditions, for those children for whom this information was available.

1. Elapsed time to first awakening when nights slept through are recorded:

The mean minutes until first awakening each night were lower (indicating an increase of sleep disturbance) on the first placebo condition, but not the second placebo condition where they are markedly increased compared to the first baseline condition (baseline 1, M = 368 min, range, 171-615 min; placebo 1, M =278 min, range, 146-673 min; placebo 2, M = 570 min, range, 461-736 min) both active medication conditions showed a marked increase, similar to placebo one (active 1, M = 564 min, range 412-713 min; active 2 M = 590 min, range, 438-725 min) the second baseline condition showed a continuation of this improvement (M = 514 min, range, 277-690 min)

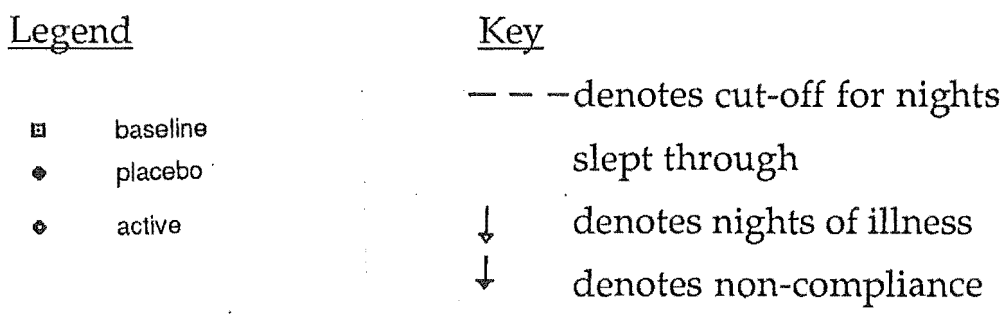
2. Elapsed time to first awakening when nights slept through are not recorded:

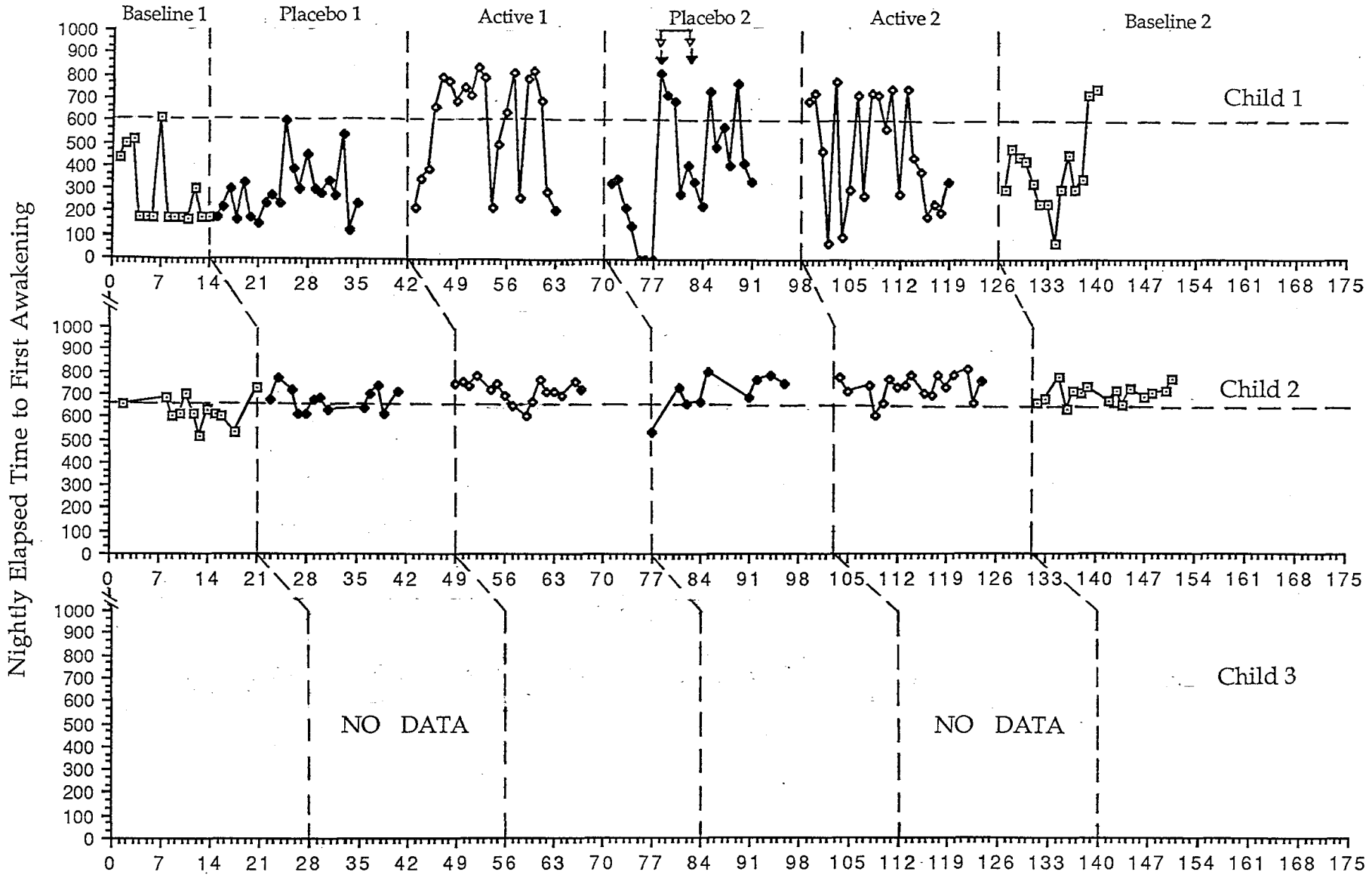
There was a decrease on this measure (indicating an increase in sleep disturbance) on the first but not the second placebo condition compared to the first baseline condition (baseline 1, M = 232 min, range, 193-262 min; placebo 1, M = 197 min, range 138-291 min, placebo 2, M = 258min, range163-348 min) there was very little difference between either active medication condition or the second baseline condition compared to the first baseline condition (active 1,M = 263, range 203-313 min, active 2, M = 248, range 180-324 min, baseline 2, M = 219, range, 132-300 min).

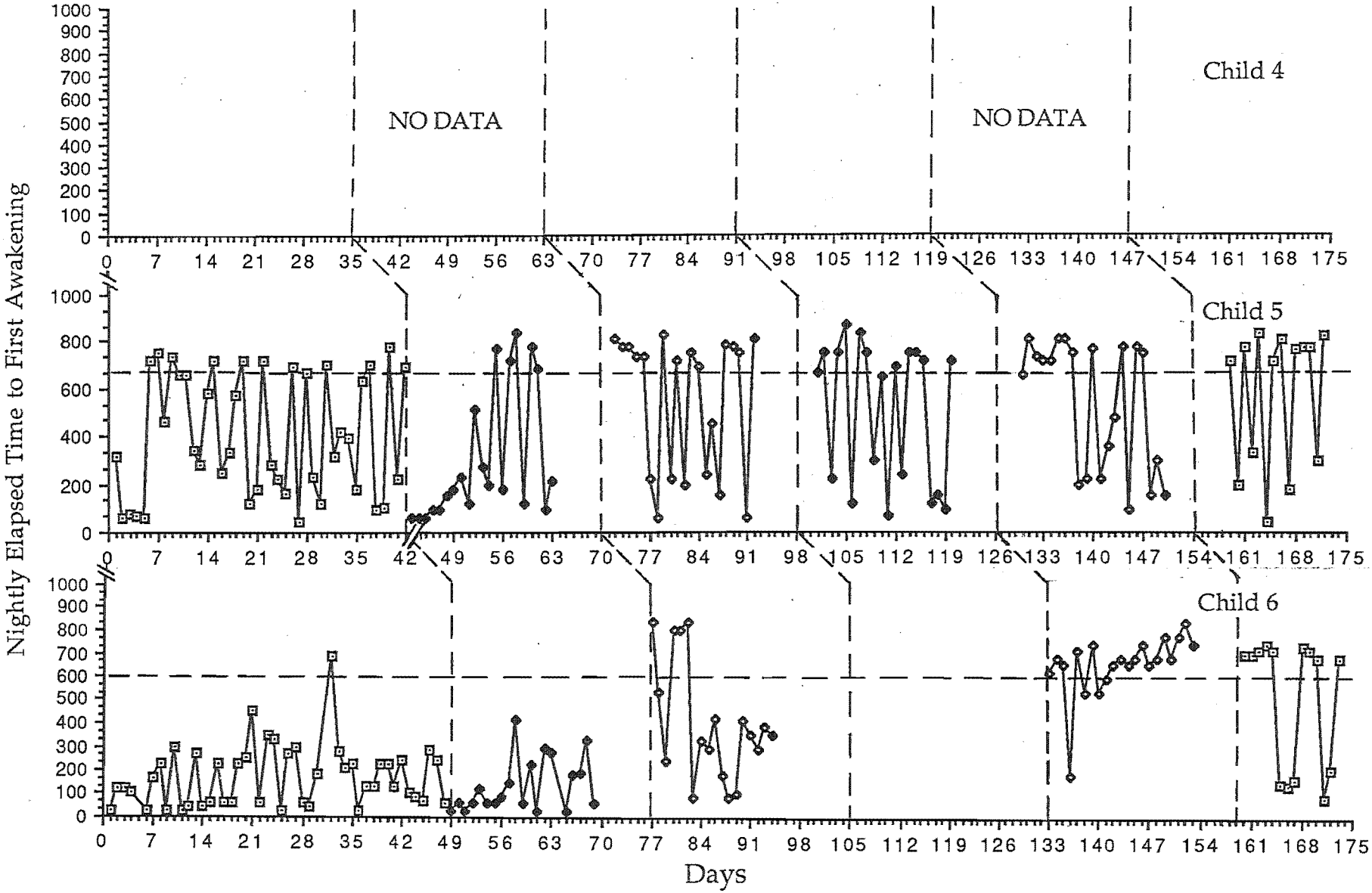
Figure 11

15 mg Group

Elapsed time to first awakening across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 1
Child 2
Child 3
NO DATA
NO DATA
Nightly Elapsed Time to First Awakening
0
100
200
300
400
500
600
700
800
900
1000
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175


Nightly Elapsed Time to First Awakening
Child 4
NO DATA
NO DATA
Child 5
Child 6
Days

10.4.3.7. Clinical outcome:

1. Clinical outcome during treatment with the medication:

All children scored considerably higher than 2.7 on the SBS during both active medication conditions (active 1: Child 1, $\underline{M}$ = 4.6; Child 2, $\underline{M}$ = 5.3; Child 3, $\underline{M}$ =5.3; Child 4, $\underline{M}$ = 10; Child 5, $\underline{M}$ = 4.7; Child 6, $\underline{M}$ = 11.3).

2. Clinical outcome after treatment with the medication was discontinued:

All children with the exception of Child Four whose score was invalid, scored considerably higher than 2.7 on the SBS during the second baseline condition (Child 1, $\underline{M}$ = 7.6; Child 2, $\underline{M}$ = 7.6; Child 3, $\underline{M}$ = 5; Child 5, $\underline{M}$ = 4; Child 6, $\underline{M}$ = 11)

10.4.3.8. Parental satisfaction:

The parents of Child Six were the only parents to be satisfied with the outcome of the medication regime. All other parents proceeded immediately to an extinction programme which was completed successfully in all cases.

10.4.3.9. Drug adaptation and drug-withdrawal insomnia:

The results taken overall failed to reveal any evidence of drug adaptation or drug-withdrawal insomnia. In fact, in some individual cases the response to the second active medication condition was more marked than the response to the first, and levels of sleep disturbance in the second placebo and second baseline conditions failed to return to the levels apparent in the first baseline condition. However there was some evidence of drug adaptation and drug-withdrawal insomnia in two individual children.

Child One showed some evidence of adaptation to the medication in that his duration of awakening was longer at the end of the first medication condition and for all the second medication condition.

Child Four showed some evidence of drug-withdrawal insomnia in that she demonstrated an increase in sleep disturbance across all measures at the beginning of the second placebo and second baseline conditions.

10.5. RESULTS 30MG GROUP

Where data is presented parenthetically within the text the following terms have been used to denote the phases:
"Baseline 1" refers to the first baseline condition.
"Placebo 1" refers to the first placebo condition.
"Active 1" refers to the first active medication condition.
"Placebo 2" refers to the second placebo condition.
"Active 2" refers to the second active medication condition.
"Baseline 2" refers to the second baseline condition.

10.5.1. Quality of the Data:

1. Intervention delay: Child Seven had a one week delay in starting the first placebo condition owing to medical practitioner unavailability. One week was removed from the beginning of the reported baselines in order that the baseline remained consecutive with the intervention.
2. Illness: Nights affected by illness, other than during the drug-withdrawal phases, are denoted on Figures 12,13 and 14. All children, except for Child Eight had at least one night affected by illness, in no case did illness affect more than 2% of recordings.

3. Non-compliance: this was deemed to have occurred under any of the following conditions:

a) When one of the study medications was given during baseline or an alternative medication condition. Child Eleven was given the active medication on three nights of the second placebo and its reducing condition.

b) When other sedative medications were given during the study. Child Eleven was given a sedative medication on seven nights of her six week first baseline condition.

c) When the medication was not given during appropriate conditions. This did not occur in this group of subjects.

d) When child management techniques were changed at any time during the data collection period. The parents of Child Ten started smacking him for awakening during the second baseline condition. Child Eleven underwent an unauthorized extinction procedure on the sixth day of data collection during the second baseline condition.

10.5.2. Results Across Children:

Means and ranges for each child and each phase across each measure are presented in Table 17.

10.5.2.1. Child Seven:

This subject presented with consistent waking of moderate duration and with considerable sleep onset delay. There was no evidence of a placebo response. In fact, both placebo conditions showed some evidence of more sleep disturbance than the first baseline condition. This child showed a marked response to both active medication conditions. Child Seven slept through only in the first baseline condition and in both active medication conditions, where considerable improvement was evident

(Baseline 1, 14%; active 1, 50%; active 2,60%). Sleep onset delay improved steadily from the first active condition throughout all subsequent experimental conditions including the second placebo condition. SBS scores reflected the overall results of all conditions (Baseline 1, M = 13.5; placebo 1, M = 12; active 1, M = 5; placebo 2, M = 11.5; active 2, M = 3). Scores on the second baseline condition showed some recovery of sleep disturbance on all measures but did not return to the levels recorded during the first baseline condition.

10.5.2.2. Child Eight:

Child Eight presented with consistent night waking sometimes of protracted duration and minimal sleep onset delay. There was no evidence of a placebo response, in fact both placebo conditions resulted in higher levels of sleep disturbance than those recorded during the first baseline condition. This subject showed a response to both active medication conditions which was more marked for the first active condition. Child Eight slept through on only two nights during the entire data collection period, once during the first baseline condition and once during the second baseline condition. SBS scores were at high levels throughout the study, falling only during the first active medication condition (baseline 1, M = 12; placebo1, M = 11.5; active 1, M = 6; placebo 2, M = 12; active 2, M = 9). The second baseline condition was of six weeks duration owing to the parents continuing to record during a delay in starting an extinction programme. Sleep disturbance during this period was markedly higher than during the first baseline condition.

10.5.2.3. Child Nine:

Child Nine presented with consistent night waking of moderate duration with the exception of one night when it was protracted. Sleep onset delay was not a problem. There was no evidence of a placebo response. This child showed a marked response to both active medication conditions which was not maintained throughout all of the second active medication condition, particularly on the duration measure although this could have been affected by illness. Child Nine slept through the night markedly more during the active medication conditions than the other conditions (baseline 1, 7%; placebo 1, 0%; active 1, 50%; placebo 2, 0%; active 2, 80%). SBS scores reflected this child's response to the medication. Measures on the second baseline condition approached those of the first baseline condition in night waking and were equal on the duration measure. Uncharacteristic levels of sleep onset delay were evident on three nights during the second baseline condition.

10.5.3.4. Child Ten:

Child Ten presented with regular night waking of short duration. Sleep onset delay was not a problem. There was no evidence of a placebo response. There was a marked exacerbation in the duration of awakening in the second placebo condition. This child showed a positive response to both active medication conditions in that the only times he slept through the night were during the active conditions and once during the second baseline condition (active 1, 20%; active 2, 30%). SBS scores reflect these occurrences (baseline 1, $\underline{M}$ = 8; placebo 1, $\underline{M}$ = 8.5; active 1, $\underline{M}$ = 6; placebo 2, $\underline{M}$ = 12.5; active 2, $\underline{M}$ = 6). A recovery of sleep disturbance was evident during the second baseline condition

which showed levels similar to those of the first baseline condition.

10.5.2.5. Child Eleven:

Child Eleven presented with consistent waking of generally short duration. Sleep onset was slightly delayed on most nights but occasionally was protracted.

There was no evidence of a placebo response, except for a reduction in sleep onset delay which carried over into the second placebo condition from the first active medication condition. Levels on other measures, however, were indicative of more sleep disturbance during the second placebo phase. This subject showed a response to both active medication conditions which was more marked in the first active medication condition although her response to the second active medication condition could have been affected by illness. This subject was most likely to sleep through the night during the active medication conditions (baseline1, 17.5%; placebo 1, 10%; active 1, 9%; placebo 2, 0%; active 2, 50%). SBS scores were consistent with these observations (baseline 1, $\underline{M}$ = 8; placebo 1, $\underline{M}$ =7; active 1, $\underline{M}$ = 2; placebo 2, $\underline{M}$ = 8.5; active 2, $\underline{M}$ = 5.5). The second baseline condition was shortened owing to parental non-compliance but appears to exceed the levels of sleep disturbance evident during the first baseline condition.

10.5.2.6. Child Twelve:

Child Twelve presented with consistent night waking of moderate duration . Sleep onset was also delayed. There was no evidence of a placebo response on the first placebo condition except for sleep onset delay which decreased, however all measures on the second placebo condition showed improvement

which appeared to carry over from the first active medication condition. This child showed a response to the first active medication condition on all measures and a response to the second active condition on all measures except for duration which recovered markedly in the latter part of this condition. This subject was more likely to sleep through the night during the active medication conditions (baseline 1, 10 %; placebo 1, 10%; active 1, 60 %; placebo 2, 20 %; active 2, 70%). SBS scores were consistent with these observations (Baseline 1, M = 9.6; placebo 1, M = 9; active 1, M = 4.5; placebo 2, M = 6; active 2, M = 4). There was a lower level of sleep disturbance during the second baseline condition than during baseline 1.

10.5.3. Results across measures:

10.5.3.1. Frequency of awakenings per night:

Figure 12 presents the frequency of awakenings per night across children and experimental conditions. The results of all subjects were marked by considerable variability in that there was considerable overlap between the ranges for the active medication conditions and the baseline and placebo measures.

There was no evidence of a placebo effect. For most subjects there was a increase in frequency of awakening during the first and second placebo conditions (baseline 1, M = 1.8, range, 1.4-2.4; placebo 1, M = 2.4, range, 1.4-3.1; placebo 2, M = 2.6, range .9-4) Frequency of awakening decreased during both active medication conditions (active 1, M = 0.7, range, .1-1.4; active 2 , M =0.7, range, .1-2.4). There was an overall increase in awakening during the second baseline condition compared with the first baseline condition (baseline 2, M = 2.2, range, 0.7-4). All subjects showed equal or increased frequency of awakening during the second baseline phase.

Figure 12

30 mg Group

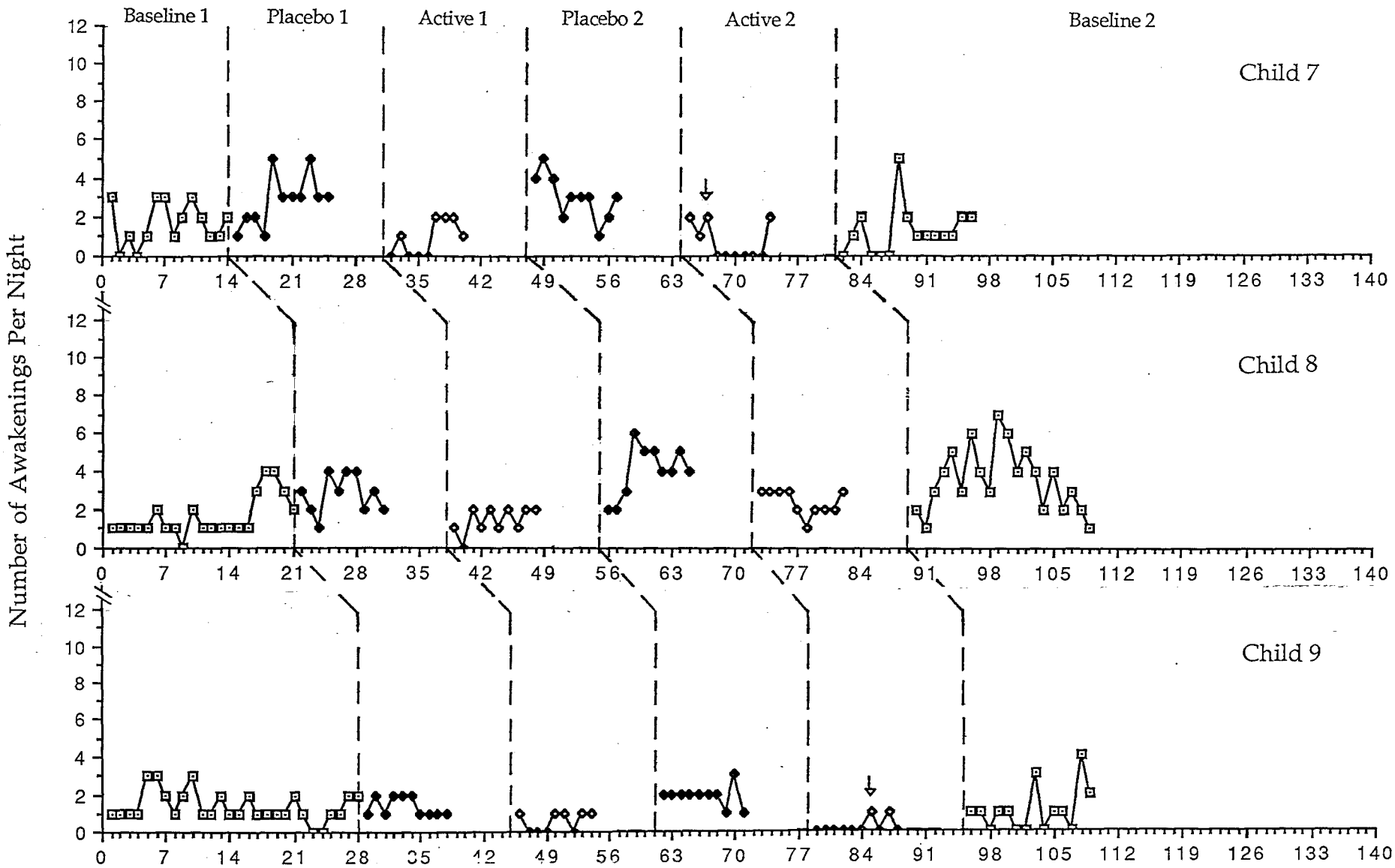
Frequency of awakening across children and conditions

Legend

- baseline
- placebo
- active

Key

- ↓ denotes nights of illness
- ↓ denotes non-compliance


Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 7
Child 8
Child 9
Number of Awakenings Per Night
0
2
4
6
8
10
12
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140

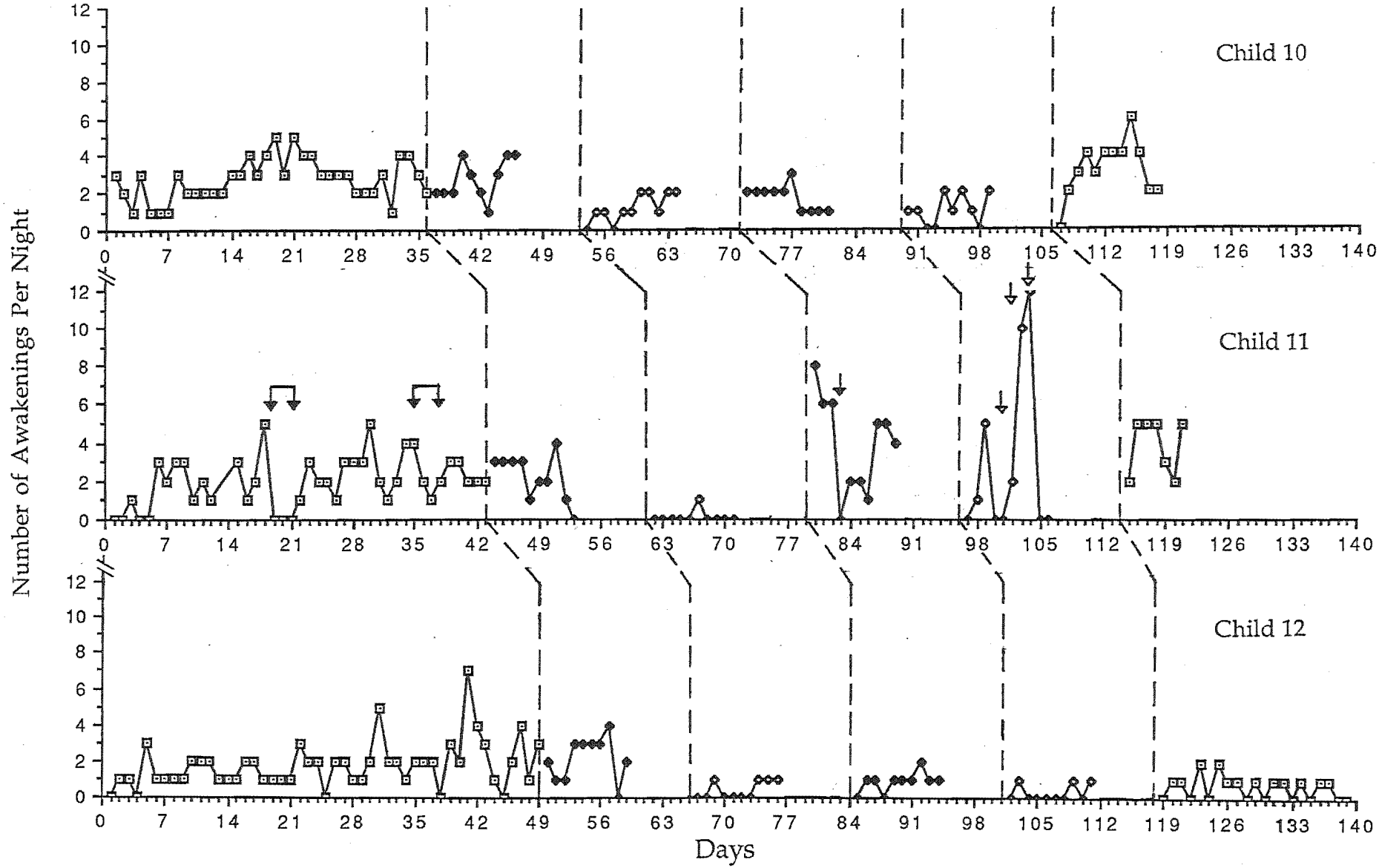
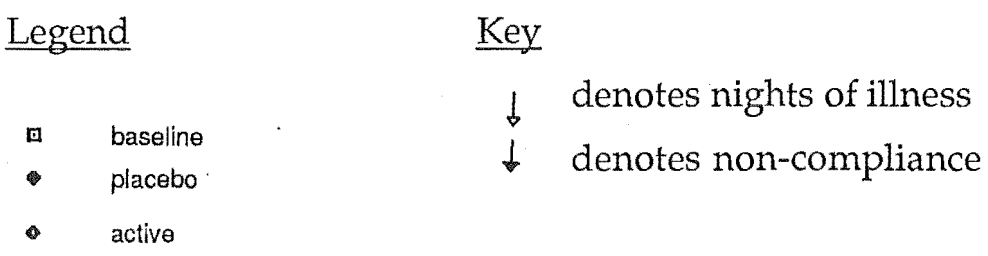
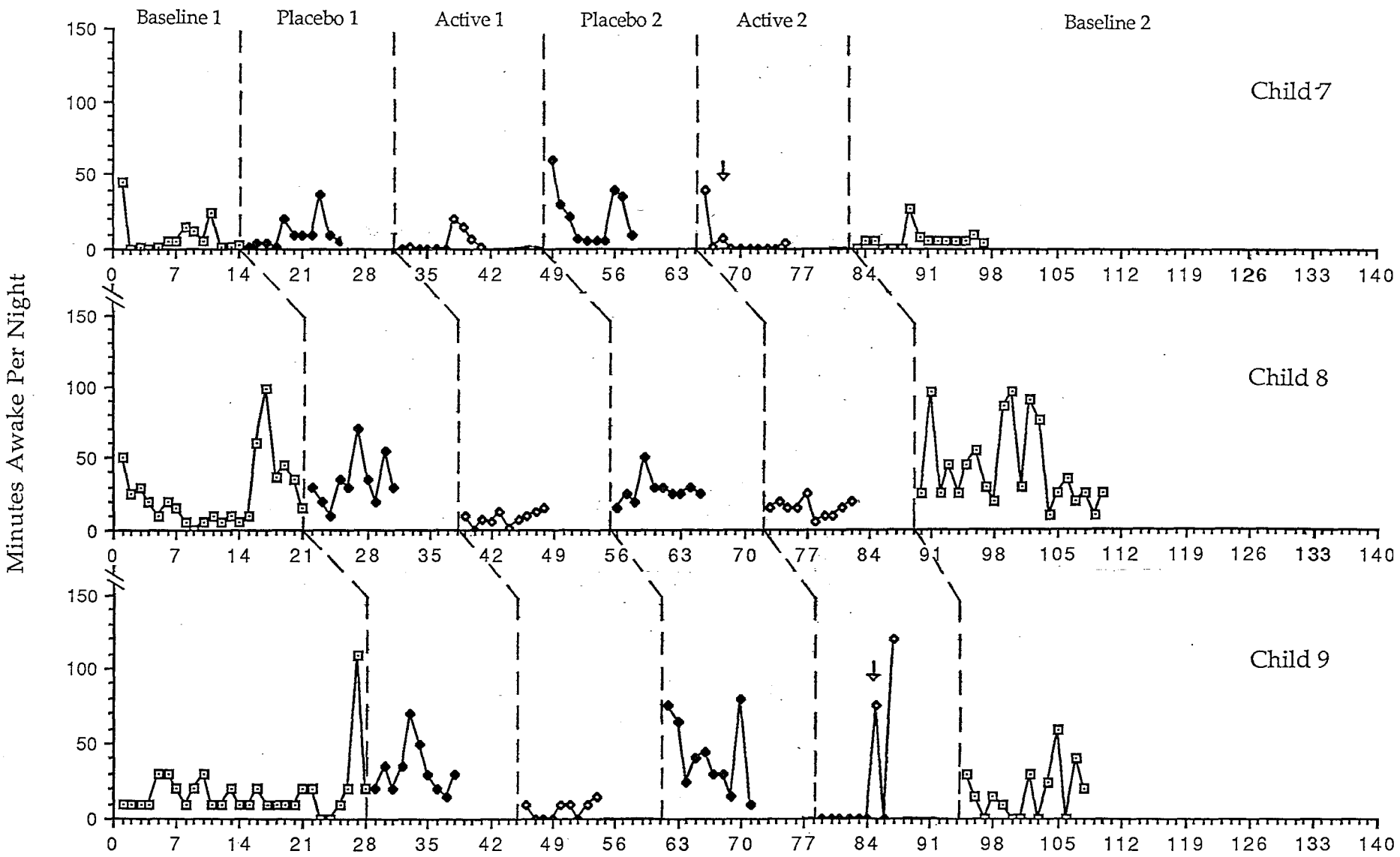

Child 10
Child 11
Child 12
Number of Awakenings Per Night
Days
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
0 2 4 6 8 10 12

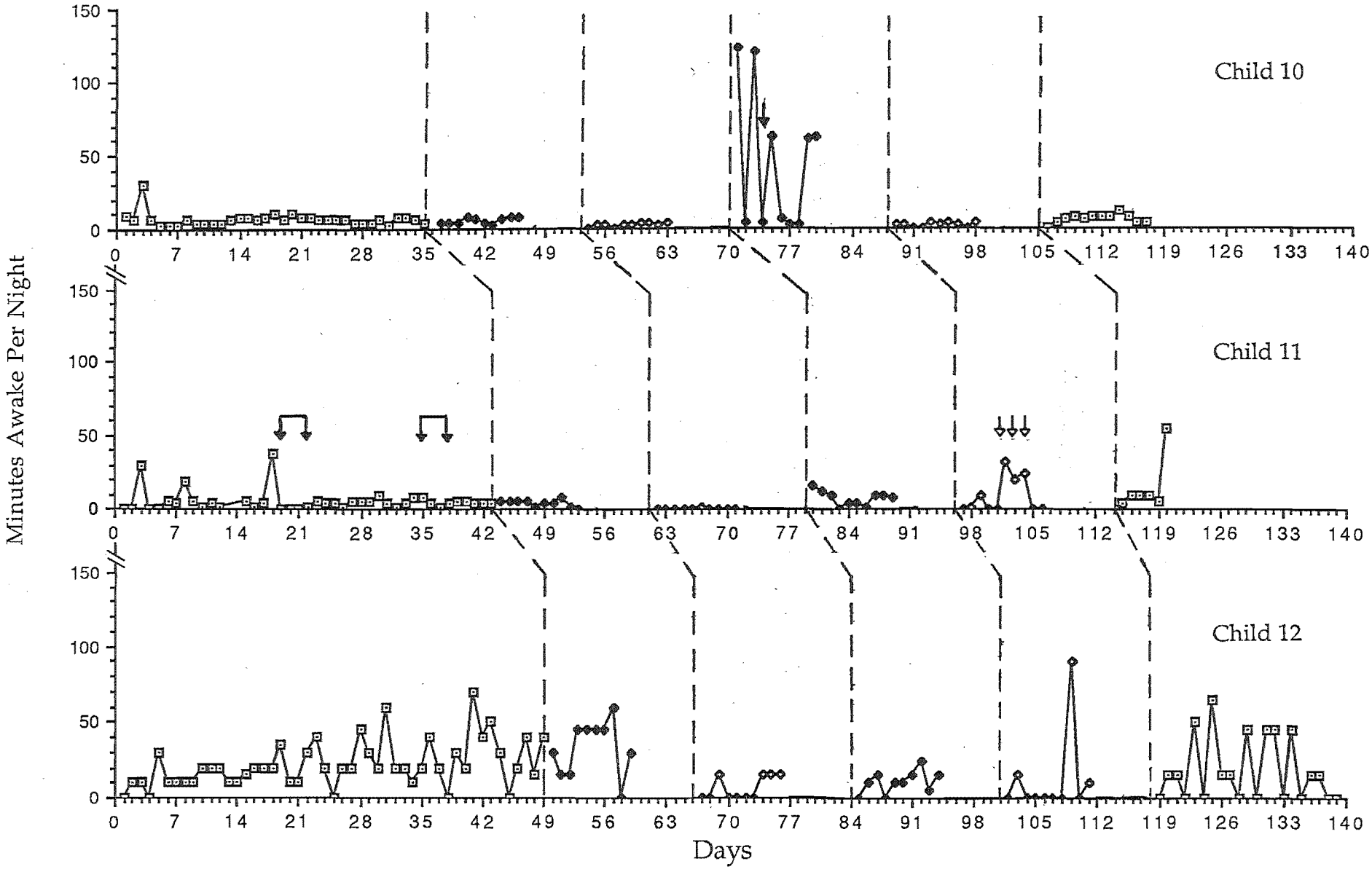
Figure 13

30 mg Group

Duration of awakening across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 7
Child 8
Child 9
Minutes Awake Per Night
0
50
100
150
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140


Minutes Awake Per Night
Child 10
Child 11
Child 12
150
100
50
0
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
Days

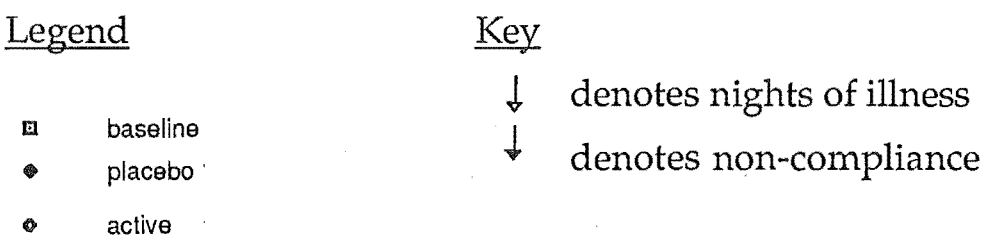
10.5.3.2. Duration of awakening per night :

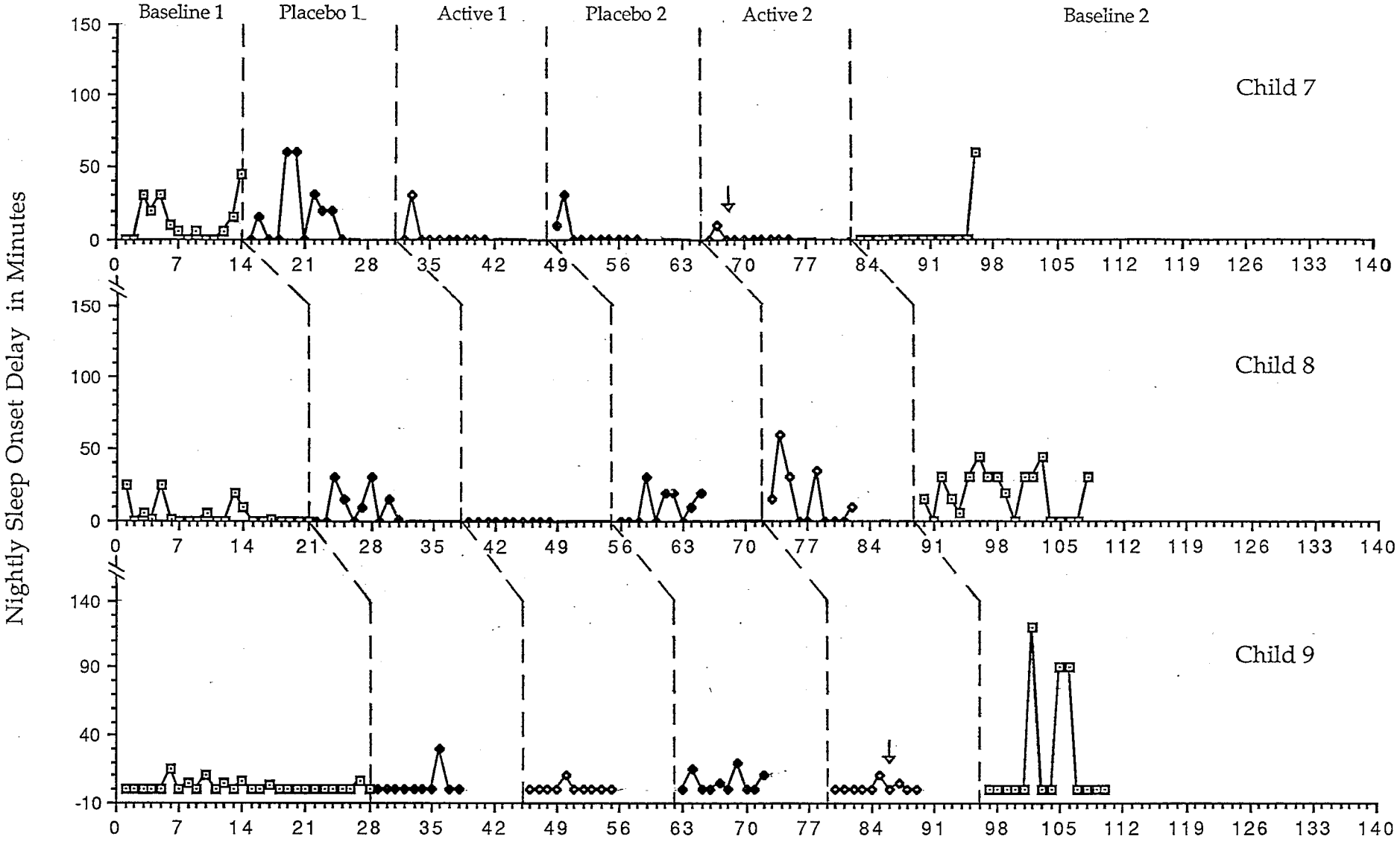
Figure 13 presents duration of awakening per night across children and experimental conditions. Results on this measure also are marked by considerable variability and overlap for most of the subjects. There was an overall increase in duration of awakening during both placebo conditions (baseline 1, M = 16 min, range, 6.3-26.1 min; placebo 1, M = 19.7 min, range, 4.4-33.5 min; placebo 2, M =25.5 min, range, 8.4-44.4) although this did not apply to all subjects. There was a marked decrease in the duration of awakening during both active medication conditions which was not as marked during the second active medication condition (active 1, M = 4.4 min, range, .2-8 min; active 2, M = 8 min, range 1.7-15 min). The results of the second baseline condition were nearly equal to those of the first baseline condition overall (M = 15 min, range, 5.6-34.3 min) with most subjects demonstrating equal or increased duration of awakening during this phase.

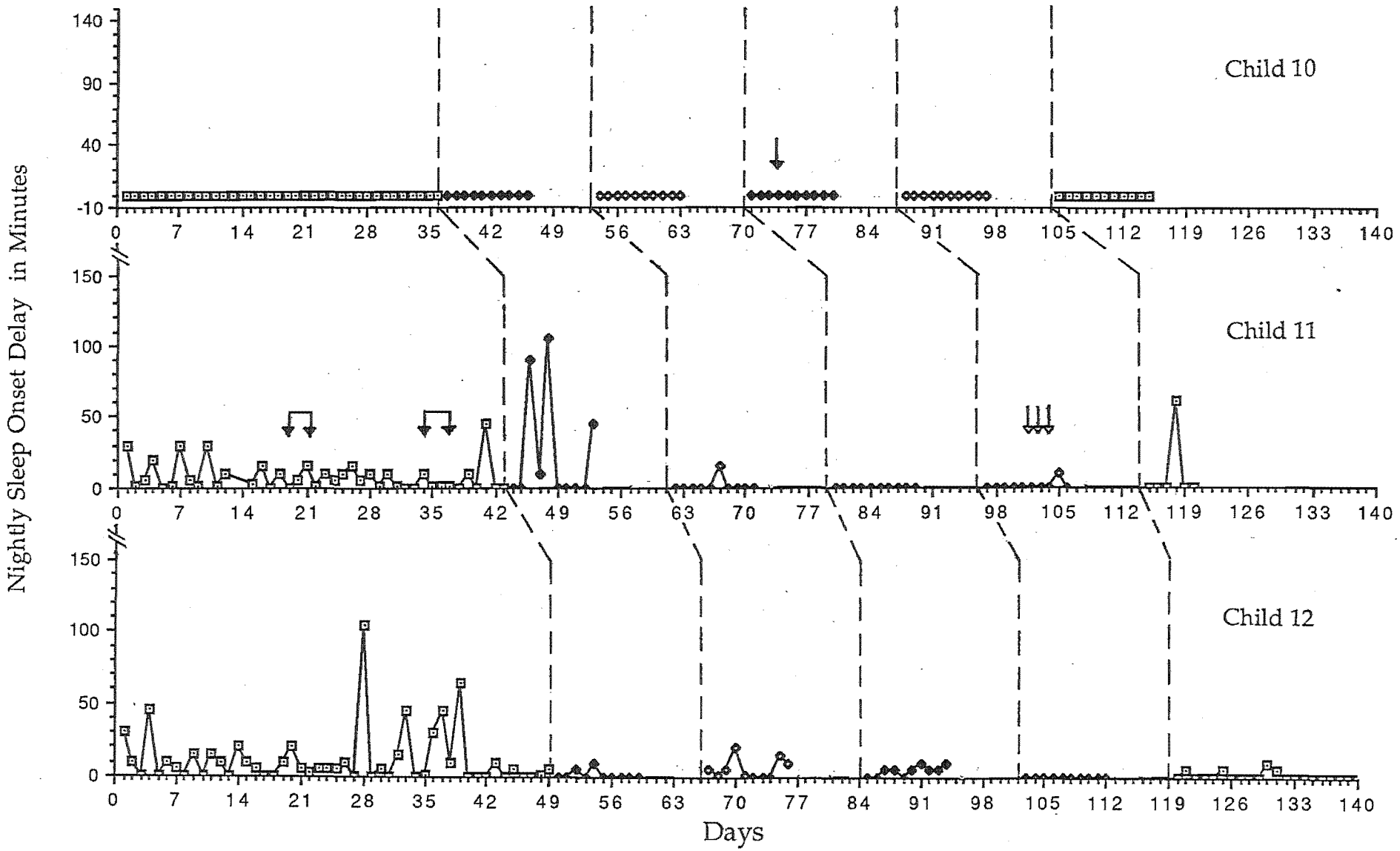
Figure 14

30 mg Group

Sleep onset delay across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 7
Child 8
Child 9
Nightly Sleep Onset Delay in Minutes
150
100
50
0
140
90
40
-10
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140


Nightly Sleep Onset Delay in Minutes
Child 10
Child 11
Child 12
Days
140
90
40
-10
150
100
50
0
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140

10.5.3.3. Sleep onset delay:

Figure 14 presents sleep onset delay across children and experimental conditions. There was considerable variability in results on this measure particularly during the first baseline and placebo phases. There was an increase in sleep onset delay during the first placebo condition and a decrease in sleep onset delay during the second placebo condition compared with the results of the first baseline condition (baseline 1, M = 7.2 min, range, 0-15.7 min; placebo 1, M = 9.3 min, range, 0-20.5 min; placebo 2, M = 3.9 min, range, 0-10 min). There was a decrease in sleep onset delay during both active medication conditions which was more marked during the first than the second active medication periods (active 1, M = 1.8 min, range, 0-5.3 min, active 2, M = 3.2 min, range 0-15 min). There was an overall slight increase in sleep onset delay during the second baseline condition compared with the first baseline condition (baseline 2, M = 8.9 min, range, 0-21.4 min) although this result was the result of changes in level and variability in only some of the subjects.

10.5.3.4. Percentage of nights slept through without awakening:

The number of nights slept through across children and experimental conditions can be seen in Figure 12 and Figure 13. This measure showed a decrease (indicating more sleep disturbance) over the first baseline condition in both placebo conditions (Baseline 1, M = 8.8%, range, 0%-17%; placebo 1, M = 3.3%, range 0%-10%; placebo 2, M = 3.3%, range, 0%-20%). This measure was sensitive to medication effects, with a marked increase during both active medication conditions (active 1, M = 46%, range, 10%-90%; active 2, M = 43%, range 0%-80%). There was a slight increase during the second baseline condition

compared with the first baseline condition (baseline 2, M = 16%, range, 0%-36%) with this result contributed to by most subjects.

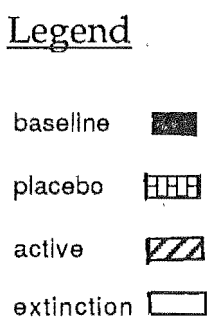
10.5.3.5. Sleep Behaviour Scale Scores:

Figure 15 presents mean weekly SBS scores across children and experimental conditions. Overall SBS scores were equal to first baseline condition scores for the first placebo condition and slightly lower for the second placebo condition (Baseline 1, M = 9.5, range, 7-6.4; placebo 1, M = 9.7, range 8-14; placebo 2, M = 8.6, range, 5.3-10.6). There was an improvement in SBS scores during both active medication conditions (active 1, M =6.8, range 4.6-11.3; active 2, M =5.7, range, 2-10) the second baseline condition scores were slightly lower than the first baseline condition scores but higher than both active medication conditions (baseline 2, M = 7.0, range, 4-11). This decrease, however, was contributed to by only two subjects.

Figure 15

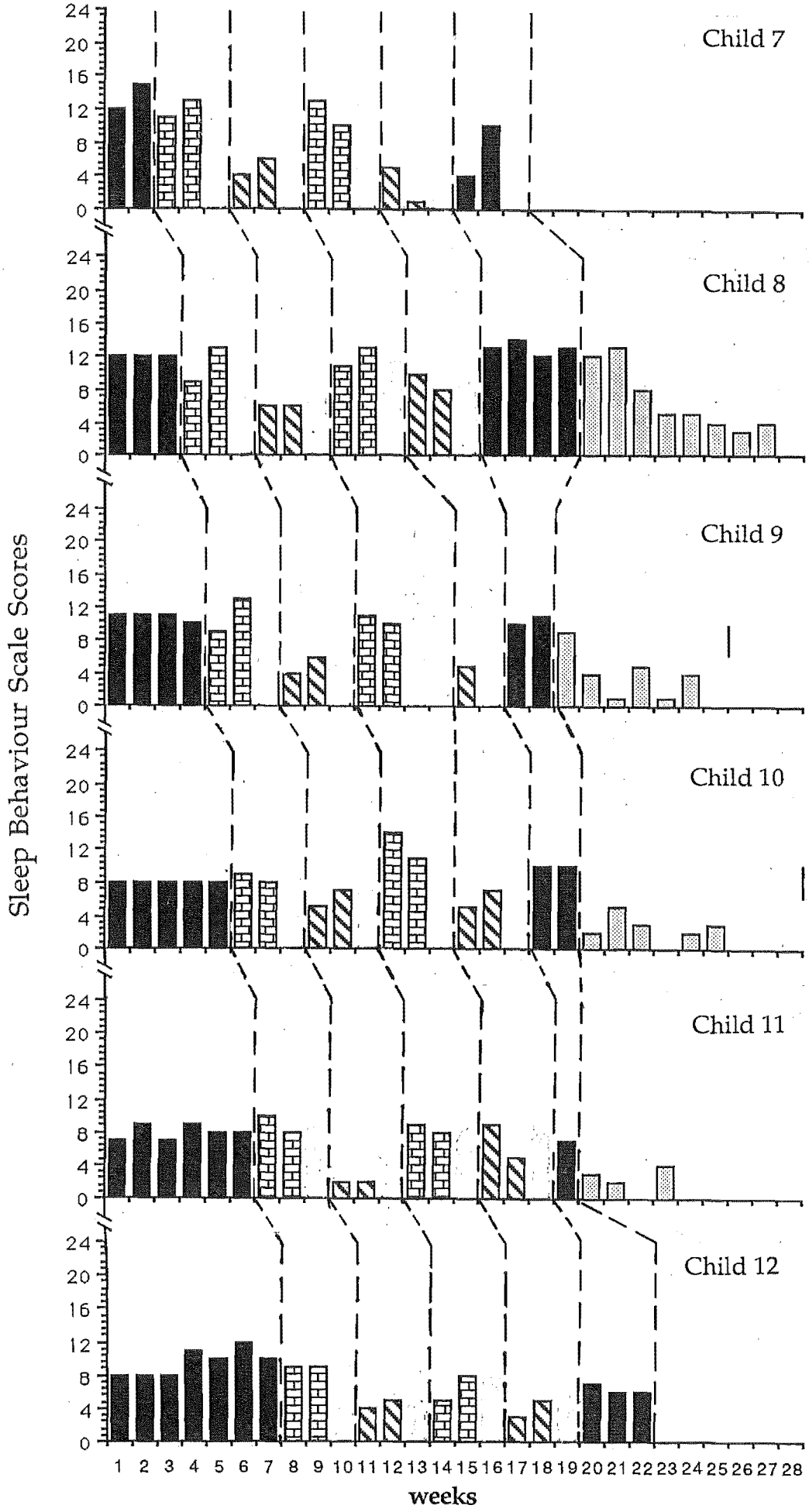
30 mg Group

Sleep Behaviour Scale scores across children and conditions



Key

| denotes end of data gathering


Child 7
Child 8
Child 9
Child 10
Child 11
Child 12
Sleep Behaviour Scale Scores
0 4 8 12 16 20 24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
weeks

10.5.3.6. Elapsed time to first awakening:

These data were available for all children in the 30mg group except for Child Seven. Figure 16 presents nightly elapsed time to first awakening, including nights where the child slept through, across children and experimental conditions.

1. Elapsed time to first awakening when nights slept through are included:

There was a decrease on this measure (indicating an increase in sleep disturbance) during both placebo conditions compared to the first baseline condition (baseline 1, M = 325min, range, 173-406 min, placebo 1; M = 273 min, range, 220-359; placebo 2, M = 283 min, range, 166-533 min) There was a marked increase during both active medication conditions (active 1, M = 559 min, range, 376-668, active 2, M = 519 min, range, 306-658 min) There was very little difference between the first baseline condition and the second baseline condition (baseline 2, M = 388 min, range, 163-748)

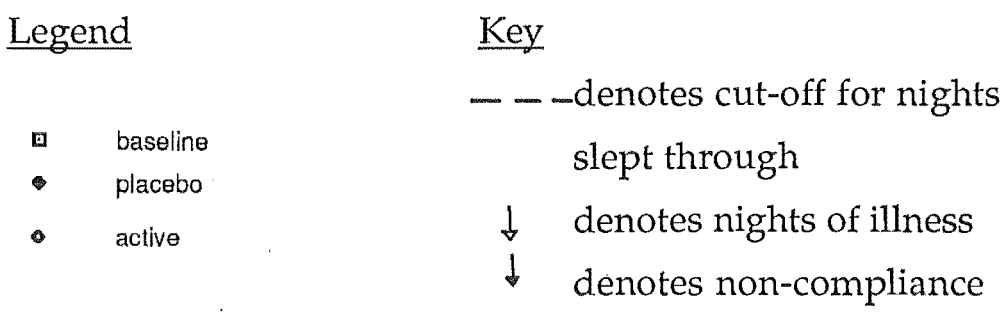
2. Elapsed time to first awakening when nights slept through are not included:

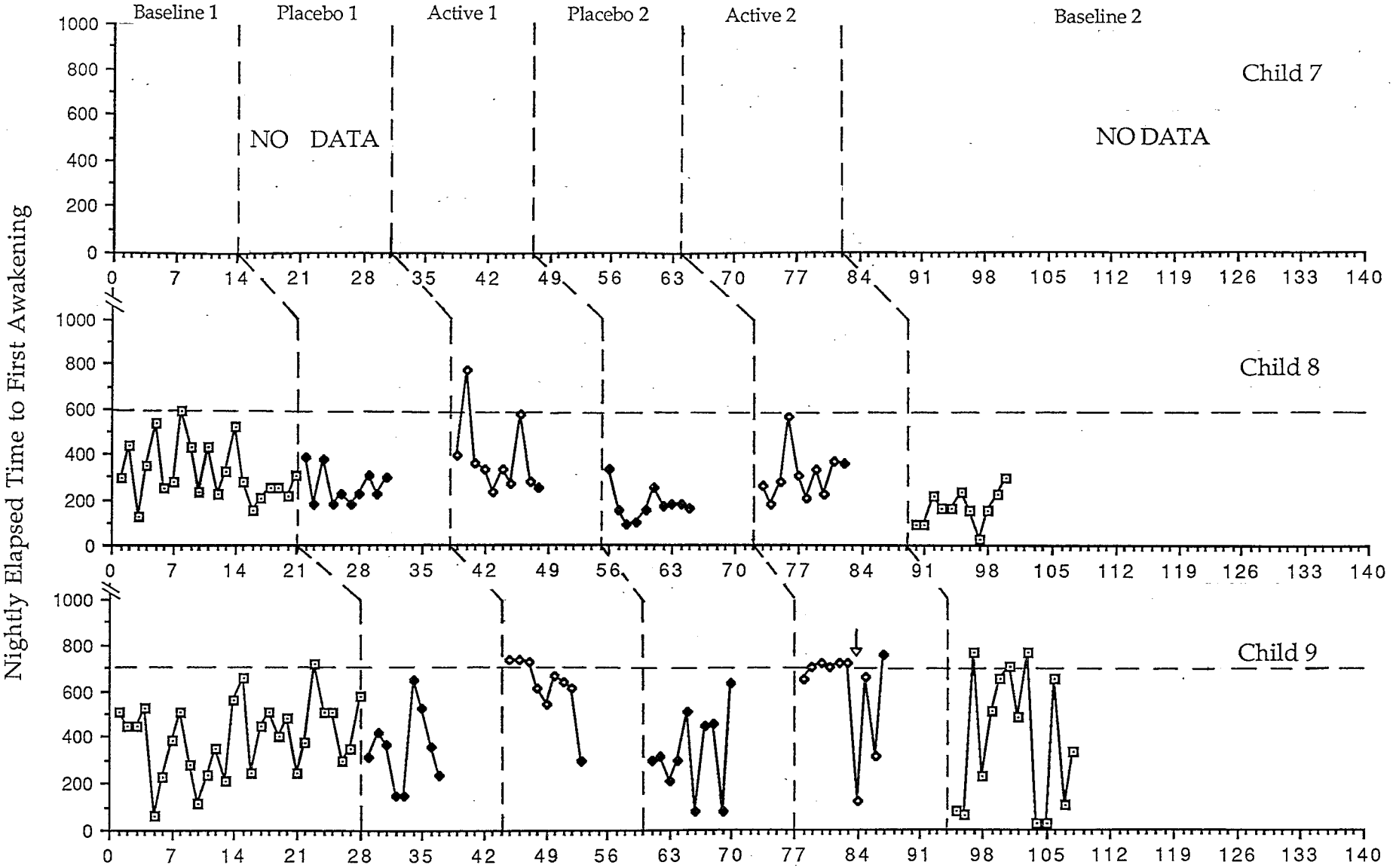
Means of this measure are lower (indicating an increase in sleep disturbance) during both placebo conditions compared to the first baseline condition (baseline 1, M=367min, range, 172-384 min; placebo 1, M =264 min, range, 187-361 min, placebo 2, M = 278 min, range, 168-514 min) there was an increase on this measure during the first active medication condition, but not during the second active medication condition, (active 1, M =433 min, range, 315-565 min; active 2, M = 293 min, range, 220-332 min). Means for the second baseline condition were markedly lower than those for the first baseline condition (baseline 2, M = 225 min, range, 165-350)

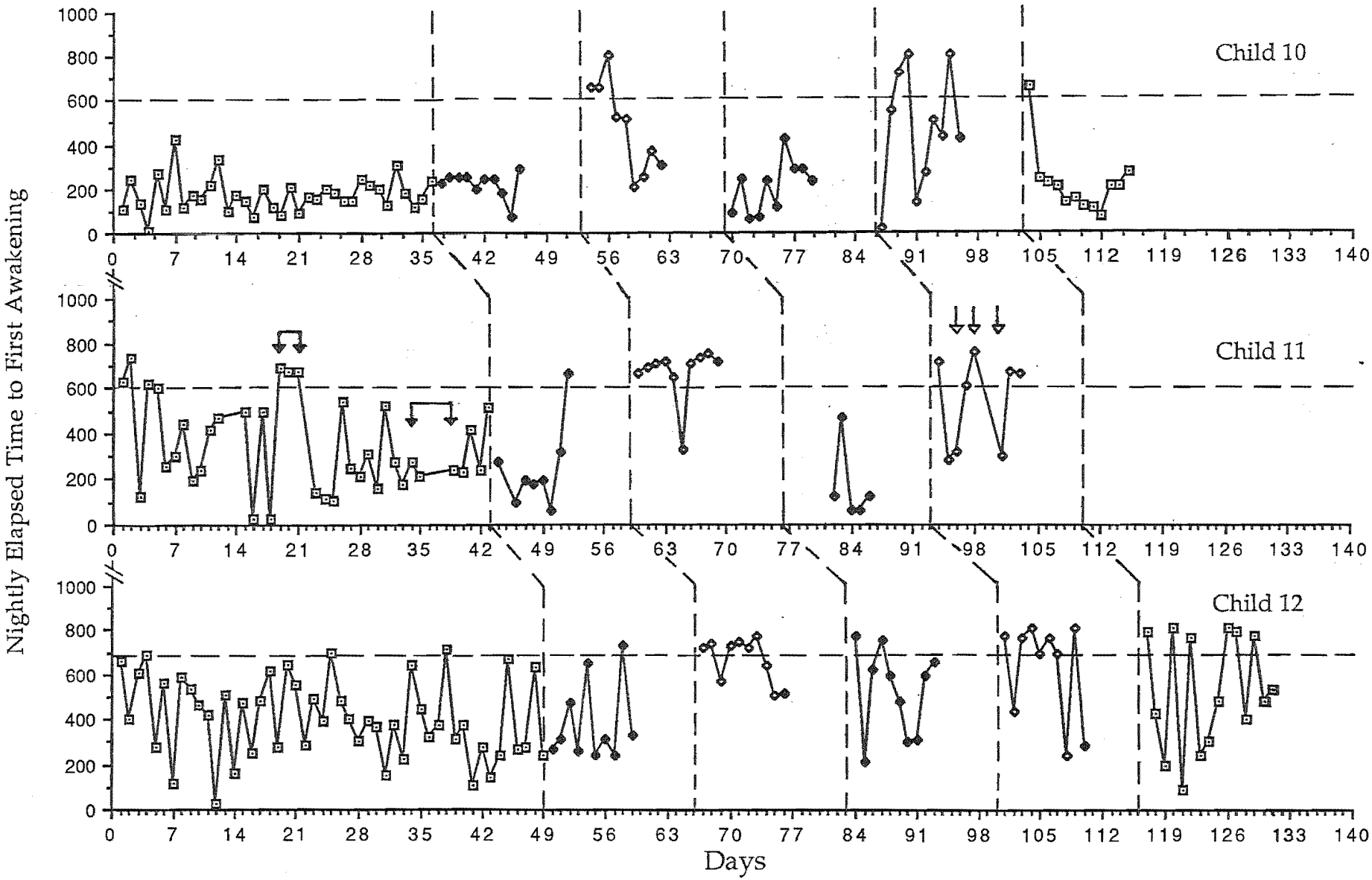
Figure 16

30 mg Group

Elapsed time to first awakening across children and conditions




Baseline 1
Placebo 1
Active 1
Placebo 2
Active 2
Baseline 2
Child 7
NO DATA
NO DATA
Child 8
Child 9
Nightly Elapsed Time to First Awakening
0
200
400
600
800
1000
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140


Nightly Elapsed Time to First Awakening
Child 10
Child 11
Child 12
Days
0
200
400
600
800
1000
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140

10.5.3.7. Clinical outcome :

1. Clinical outcome during treatment with the medication: Child Nine and Child Eleven were the only children to score less than 2.7 during treatment with the medication. A mean SBS score of 2.5 was attained by Child Nine during the second active medication condition but not the first where his mean SBS score was 5. An SBS score of 2 was attained by Child Eleven during the first active medication condition but not maintained during the second active medication condition when her mean SBS score was 5.5. Other children's scores were well above the 2.7 criterion (Active 1: Child 7, $\underline{M}$ = 5; Child 8, $\underline{M}$ = 6; Child 10, $\underline{M}$ = 6; Child 12, $\underline{M}$ = 4.5; Active 2: Child 7, $\underline{M}$ = 3.5, Child 8, $\underline{M}$ = 9; Child 10, $\underline{M}$ = 6; Child 12, $\underline{M}$ = 4)

2. Clinical outcome after treatment with the medication was discontinued. None of the subjects scored as low as 2.5 during the second baseline condition (Child 7, $\underline{M}$ = 7; Child 8, $\underline{M}$ = 12.8; Child 9, $\underline{M}$ = 10.5; Child 10, $\underline{M}$ = 10; Child 11, $\underline{M}$ = 7; Child 12, $\underline{M}$ = 6.3).

10.5.3.8. Parental satisfaction:

All parents wished to proceed to an extinction programme which was completed successfully in all cases.

10.5.3.9. Drug adaptation and drug-withdrawal insomnia

Consideration of the results overall failed to reveal any evidence of drug adaptation or drug-withdrawal insomnia. In fact, in some individual cases the response to the second active medication condition was more marked than the response to the first active medication condition and levels of sleep disturbance in the second placebo and second baseline conditions failed to return to the levels apparent in the first baseline condition. However

there was some evidence of drug adaptation and/or drug-withdrawal insomnia in three individual children.

Child Eight showed some evidence of adaptation to the medication given that her response to the second active medication phase was less marked than her response to the first active medication phase. She also showed some evidence of drug-withdrawal insomnia in that her sleep disturbance was worse on all measures during the second placebo and second baseline conditions.

Child Nine showed some possible adaptation to the medication at the end of the second active medication condition. He was also ill for one night so interpretation of this is difficult.

Child Eleven showed some evidence of both adaptation and drug-withdrawal insomnia given that her sleep disturbance was worse on all measures during the second placebo and second active medication conditions. Interpretation of this, however, is made difficult in that she also experienced some illness over this time.

Table 18. Summary of results, Study Two

N.B + denotes improvement, - denotes no data or not applicable. S.O.D. denotes sleep onset delay. E.T (W) denotes elapsed time to first awakening without the inclusion of nights slept through.%T.N denotes percent of nights slept through

	Child 1						Child 2						Child 3					
Measure	A	A1	B	A1	B	A	A	A1	B	A1	B	A	A	A1	B	A1	B	A
Frequency			+	+					+		+				+		+	+
Duration			+								+				+		+	+
S.O.D.	-	-	-	-	-	-					+		-	-	-	-	-	-
SBS			+		+				+		+				+		+	+
E.T(W)			+				-	-	-	-	-	-	-	-	-	-	-	-
%T.N.			+	+	+	+			+		+				+		+	+

	Child 4						Child 5						Child 6					
Measure	A	A1	B	A1	B	A	A	A1	B	A1	B	A	A	A1	B	A1	B	A
Frequency									+	+	+	+			+	-	+	+
Duration									+	+	+	+			+	-	+	+
S.O.D.							-	-	-	-	-	-	-	-	-	-	-	-
SBS									+	+	+	+					+	
E.T.(W)	-	-	-	-	-	-												
%T.N.									+	+	+	+			+		+	+

Table 18 Continued

Child 7

Measure	A	A1	B	A1	B	A
Frequency			+	+	+	
Duration			+	+	+	+
S.O.D.		+	+	+	+	+
SBS			+	+	+	+
E.T.(W)	-	-	-	-	-	-
%T.N.			+		+	+

Child 8

Measure	A	A1	B	A1	B	A
Frequency			+		+	
Duration			+		+	
S.O.D.			+			
SBS			+		+	
E.T.(W)						
%T.N.			+			

Child 9

Measure	A	A1	B	A1	B	A
Frequency			+		+	
Duration			+		+	
S.O.D.	-	-	-	-	-	
SBS			+		+	
E.T.(W)						
%T.N.			+		+	+

Child 10

Measure	A	A1	B	A1	B	A
Frequency			+		+	
Duration						
S.O.D.	-	-	-	-	-	-
SBS						
E.T.(W)						
%T.N.			+		+	

Child 11

Measure	A	A1	B	A1	B	A
Frequency			+		+	
Duration			+		+	
S.O.D.			+	+	+	
SBS			+		+	
E.T.(W)						
%T.N.			+		+	

Child 12

Measure	A	A1	B	A1	B	A
Frequency			+	+	+	+
Duration			+	+		
S.O.D.		+	+	+	+	+
SBS			+	+	+	+
E.T.(W)						
%T.N.			+		+	+

10.6 DISCUSSION

A summary of the results of this rather complex experiment is presented in Table 18 This table summarizes which children had improvements in their sleep disturbance and the conditions during which this occurred.

In retrospect, the complexity of this experiment meant that some of the questions posed are difficult to answer. Given the replication design, examination of the children's responses should have clearly demonstrated the effect of the medication. One would have expected no response during the first placebo condition, a marked response for the first active medication condition, a return to baseline measures during the second baseline condition, a repeat of the drug effect during the second active medication condition and a return to first baseline levels during the second baseline condition. Table 18 demonstrates that only Child Two and Child Eight responded in this fashion. The other children either responded very little if at all (Children Four and Ten) or responded during the second placebo and baseline conditions as well as during the active medication conditions. Given that no response occurred prior to the administration of the active drug in any subject, it is reasonable to assume that all subsequent response was to the drug and the failure of the reversal in those subjects who continued to show improvement in the second placebo and baseline conditions was due to carry over of the drug effects from the active medication conditions.

A review of results from all the subjects in both the groups, therefore, indicates that administration of trimeprazine did reduce infant sleep disturbance on a variety of measures, at both dose and administration regimes. This reduction, however, did

not lead to consistent non-sleep disturbed SBS scores in any child, although it is difficult to ascertain from Richman's (1985) article what range of SBS scores is considered acceptable for children who are sleeping well.

The original intention, had been to collect second baseline recordings for all subjects until their sleep disturbance had reached the same levels they had shown during the first baseline recordings. This was in order to ascertain how durable the response to the medication had been. However, this was not possible, as the parents demanded management advice immediately the second active medication condition was completed, being frustrated with the length of time they had waited, with no clear benefit from the medication. Although some children did show reduced sleep disturbance during the second baseline and placebo conditions, these reductions were slight. In no case were these changes clinically significant, nor, except in one of the twelve cases, were they acceptable to parents. It was concluded, therefore, that there was no evidence to support the assertion that the use of sedative medication can break the sleep disturbance habit (Illingworth ,1968; Lask, 1981; Valman, 1981). These findings are in accord with those of Richman (1985) and Simonoff and Stores (1987).

The drug administration regime used in this research was closest to that advocated for breaking the waking habit by Valman (1981) who suggested a sedative be administered at a reducing level over four weeks. It is unlikely that the shorter administrations suggested by Lask (1977) and Illingworth (1968) would be any more effective.

All children receiving 30mg of drug responded to the medication in some way during both active medication phases whereas there was a clear response for both active medication conditions in only

four subjects in the 15mg group. The 30mg dose was slightly more efficacious, although three children in the 15mg group showed improvements during the second baseline condition, compared to only two in the 30 mg group. Of course the two groups cannot be unequivocally compared given that the 30mg group had been treated with sedatives prior to this investigation.

There was no clear difference in response to the medication in the second, compared to the first, active medication phases nor any trend towards less response over the two active medication conditions in either of the groups, suggesting that there was no consistent pattern of adaptation to the medication. Neither was there an overall exacerbation of sleep disturbance in the second placebo conditions or the second baseline which would have been evidence of drug-withdrawal insomnia.

There was exacerbation of sleep disturbance during the first placebo condition, and in some cases during the second placebo condition, particularly in the overall results of the 30mg group. This is difficult to explain. The parents of Children Seven and Eight placed their infants to bed markedly earlier during the first placebo condition than had been their pattern during the first baseline condition. This may have been due to the parent's expectation that their child would settle earlier on the medication. It is possible that the earlier bedtime led to a longer sleep onset delay and more night waking which affected the overall means for the group. Inspection of the individual means of these subjects supports this, however an overall increase in sleep disturbance during the first placebo condition is not evident in the 15mg group in which three children were placed down earlier during this condition.

The elapsed time to first awakening increased markedly when nights slept through were included but not when they were

excluded. Hence awakening was not delayed as a result of the medication on nights when awakening occurred. Awakening was not deferred until the medication had passed peak plasma concentrations and this therefore, cannot explain the variability of response to the medication evident in many children's results.

Review of individual child responses does not allow the categorical conclusions that a consideration of group results allows. Although most children showed a decrease in sleep disturbance during the active medication phases, this response was very variable, both within and between children. In all cases, even where a response to the medication was shown there was overlap between the active medication and baseline conditions. This means that even if a child showed some response to the medication his or her parents could still expect the child's sleep to be as disturbed as it was during baseline, at least on some nights.

Child Four (15 mg group) showed no response to the medication at all and did not sleep through the night at any stage of the data gathering period. Child Eight (30mg group) showed very little response at all, sleeping through on only two nights in the entire period.

Child Five (15mg group) showed a marked improvement in sleep disturbance at the beginning of the first active medication condition. This showed some carry over to the subsequent conditions including the second baseline condition but may have been a response to the parents' modification of her diet which started at the beginning of the first active medication condition and apparently had a marked positive effect on all her behaviour. This change in diet was in response to the child's sensitivity to tartrate dyes and consisted of removing all foods, such as cheese, which contain them.

Further consideration of the results of individual subjects shows clear evidence of adaptation to the medication in several individuals of the 30mg group. Child Eight, Child Nine and Child Eleven in this group showed responses to the first active medication condition which are more marked than their responses to the second active medication condition although illness makes interpretation of these results difficult for Child Nine and Child Eleven. Two of these children (Child Eight and Child Eleven) showed some evidence of drug-withdrawal insomnia.

There are also two clear examples in the 15mg group of adaptation to the medication and drug-withdrawal insomnia, possibly in response to the medication. Child One, showed a marked deterioration on the duration of awakening measure during the end of the first active medication condition which carried over through the second placebo condition, the second active medication condition and into the second baseline condition. This deterioration in the second placebo condition (which is underestimated, given the effects of the child's illness) and the second baseline condition may be a rebound in sleep disturbance, the result of drug-withdrawal. The lower response at the end of the first active medication condition and for the second active medication condition may be evidence of an adaptation to the medication. Child Four's exacerbation in sleep disturbance during the second placebo and second baseline conditions may be evidence of drug-withdrawal insomnia. On the whole, there was some evidence of adaptation to the medication in the 15mg group and a little more evidence of adaptation in the 30mg group, although interpretation of the results from two children was difficult. There was some evidence of drug-withdrawal insomnia in both groups. It may be that drug adaptation and drug-withdrawal insomnia affect some children

and not others. It also may be that there would be more general adaptation to the medication if it were administered over a longer period. The manner in which this experiment was conducted created a conservative test for the presence of drug adaptation and drug-withdrawal insomnia. The children in this study received their medication for short times only yet there was some adaptation to the medication especially at the higher dose. The gradual withdrawal of the medication between phases would have minimized the likelihood of drug-withdrawal insomnia.

Given the length of time some children receive sedative medication (Chavin & Tinson, 1980), the question of whether infants adapt to the medication warrants further investigation in children treated for more extended periods, as does the question of whether extended periods of medication use increase the risk of drug-induced insomnia. A question however, could be raised regarding the ethics of continued investigation of medication for long-term use, given the availability of effective behavioural treatments which do not rely on drugs.

All cases had SBS scores during the second baseline condition which indicated continued sleep disturbance when compared to Richman's (1985) criteria. When the outcome of the intervention was discussed with the parents, no parents requested to continue on the medication. All parents, except for those of Child Six (15mg group) proceeded with a behaviour modification programme, either devised by the experimenter or of their own volition. In the case of Child Six (15mg group) parents' disagreement, not a marked improvement in sleep disturbance, was the reason for declining the programme.

The non-compliance of the parents of Child Four and Child Six (15mg group) and Child Ten and Child Eleven (30mg group) warrants comment. These are clear examples of the inadequacy of

sedative medication in the treatment of infant sleep disturbance. These children all underwent an extinction programme which had not been discussed with the experimenter. In addition Child Four (15mg group) was given brandy during the second baseline condition, Child Ten (30mg group) was given other sedative medication at various points of the data gathering period and smacked during the second baseline condition. In all cases where unauthorized extinction was used, other than Child Six (15mg group), this was during the second baseline condition. All the non-compliance arose from the parents frustration with the lack of response to the medication and the length of time they had waited since the beginning of data collection with no apparent improvement in the sleep disturbance. Comments of frustration were made by most parents who, with only one exception, all accepted the extinction programme offered by the experimenter and completed it successfully. In the case of Child Six (15mg group) the parents were unable to agree on the acceptability of an extinction procedure. Extinction was acceptable to the father who had, on his own initiative, successfully started such a procedure during his wife's hospitalization. However the wife was unable to agree to such a procedure and decided, finally, that the slight improvement in the child's sleep disturbance was satisfactory.

The strengths of this study were that it was successful in confining its consideration to sleep disturbance in infants, it considered individual variation in response to the medication and considered a lower dose rate, in one group than had been considered by either Richman (1985) or Simonoff and Stores (1987). There were, however, several methodological problems with this study. Although in effect the allocation of infants to groups was random in that subject selection started at an arbitrary point in the order of referrals, it would have been

technically more correct to have allocated children to conditions in a truly random fashion. The inclusion of children who had been treated with sedatives in the past made subject selection more rapid but did not allow direct comparison of groups. Similarly, changing two different criteria, that is dose and length of time sedatives were administered for made direct comparison of the two groups difficult and did not allow a clear preference for either medication regime to be established. This is significant in that, to the extent that the drugs were effective, the 15mg of trimeprazine was not markedly less effective than the 30mg of trimeprazine. It is impossible, however to state whether a lower dose of the medication is preferable because this effect could have been due to the 15mg group responding more readily given that they had no prior history of medication use. Similarly it could have been due to the fact that the 15mg was administered for a longer time. In defence of the experimental design, however, given that neither regime led to a clinically significant response or a long term decrease in sleep disturbance, comparing the groups is of academic rather than clinical interest.

The hypotheses presented in Chapter Seven have been indirectly addressed in this discussion section, Table 19 refers formally to each hypothesis regarding whether it was supported or not.

Table 19.

Summary of hypotheses and outcome

HYPOTHESIS	OUTCOME
S2,H1: That trimeprazine would have no measurable effect on infant sleep disturbance at either drug regime.	- trimeprazine did have an effect on infant sleep disturbance.
S2,H2: That both active drug regimes would result in some measurable effect on infant sleep disturbance but that there would be a similar effect during treatment with the placebo, both effects resulting from parental expectations only.	- effect of drug was to improve sleep disturbance in most cases placebo exacerbated or did not affect sleep disturbance.
S2H3: That there would be reductions on all sleep disturbance measures during treatment with trimeprazine at both drug levels, but that these changes would be minor, and transient.	+ + There were measurable improvements in response to both drug regimes, but these were not clinically significant or durable.
S2H4: That there would be reductions on all sleep disturbance measures during treatment with trimeprazine at both drug levels, and that these changes would be clinically significant.	- reductions were not clinically significant.
and that if S2,H3 or S2,H4 were true,	
S2,H5: That there would be more reduction in sleep disturbance in response to the higher drug	+ More children responded to the 30mg dose and their response level was replicated, but more children on the 15mg dose showed continued improvement during the second baseline.

S2,H6: That there would be no changes in any sleep disturbance measures during treatment with placebo (if S2,H2 were false).	+ There was no placebo effect other than some exacerbation or carryover from a previous condition for some infants
S2,H7: That, if S2,H3 and/or S2,H4 were true, reductions in sleep disturbance would be maintained after treatment with trimeprazine at the higher dose, but not at the lower dose.	- What maintenance of effect there was, was more evident in the 15mg group.
S2,H8: That there would be evidence of adaptation to the drug and drug withdrawal insomnia at both levels of administration.	+ Drug adaptation and drug-withdrawal insomnia affected some individual children only.
S2,H9:That there would be large intra and inter individual variations in response to trimeprazine.	++

N.B. ++ denotes that the hypothesis was supported, + denotes qualified support and - denotes that the hypothesis was not supported.

10.7. CONCLUSION

Although trimeprazine has an effect on sleep disturbance this effect varies within individuals and is not consistent in that infants may continue to show sleep disturbance even when being treated with the medication. It does not have a lasting clinically significant effect on sleep disturbance, nor is continued treatment with it acceptable to parents. Its effect of increasing the chances that a child treated with it will sleep through the night leaves it as a useful treatment for short term parent relief but it does not have a place in the long term management of infant sleep disturbance. The development of behaviour management approaches to the

treatment of infant sleep disturbance is therefore a desirable alternative to drug treatment.

CHAPTER ELEVEN

STUDY THREE

11.1. INTRODUCTION

Study One showed that extinction was effective in reducing infant sleep disturbance. These results agree with those of Lawton (1985) and Moesbergen (1987) who used identical procedures and are consistent with other reports where extinction has been used either in case studies, or combined with other techniques and used with children of mixed ages (Richman et al., 1985; Rickert & Johnson, 1988; Sanger et al., 1981; Seymour, Bayfield et al., 1983; Seymour, 1987; Williams, 1959).

Extinction, however, is not without its problems. Authors writing on the properties of extinction per se point out that it often leads to a temporary increase in rate and intensity of responding (the post extinction response burst), may be followed by spontaneous recovery and may sometimes, be accompanied by aggressive responses by the subject (Sulzer, Azaroff & Meyer, 1977). These properties of extinction create problems when extinction is used (Drabman & Jarvie, 1977). Additional problems have also been pointed out. Sajwaj (1973) described a case where a parent was unable to carry out extinction, in a home setting, because of too many competing responsibilities, while Benoit and Meyer (1974) suggest the use of another technique if a temporary worsening of the behaviour cannot be tolerated or reinforcers cannot be withheld. If extinction is attempted but not carried out correctly, the result is intermittent

reinforcement of the problem behaviour leading to more resistance to extinction (Bijou, 1957; Brackbill, 1958).

These problems are apparent when extinction is applied to infant sleep disturbance. Williams (1959) described an increase in responding at the beginning of both extinction trials in his extinction study. Rickert and Johnson (1988) describe the phenomenon more specifically as an increase in the duration of awakenings rather than the frequency of awakenings, that is, infants undergoing the initial stages of an extinction procedure for their sleep disturbance spend more time awake and crying rather than awakening more frequently. Lawton (1985) points out that the paradoxical effect of extinction temporarily increasing sleep disturbance is potentially aversive, both to parents and infants. She describes parental anxiety on hearing the infant crying and consequent inability to refrain from attending to the crying. She asks whether it is ethical to increase the infants demands if parents find this stressful and points out the levels of exhaustion, distress and anxiety in many parents who present with a sleep disturbed child. Lawton also points out that many infants who present as sleep disturbed have been reinforced on an intermittent schedule of reinforcement in that their parents have tried to implement an extinction programme by leaving them to "cry it out" but have been unable to sustain their ignoring in the face of their infant's distress. This results in infants whose sleep disturbance is highly resistant to extinction.

The difficulties highlighted by Lawton (1985) were used as justification for the use of a graduated extinction programme. Other authors have made similar points. Rolider and Van Houten (1984) also evaluated a graduated extinction procedure on the basis that parents find it too aversive to ignore bedtime crying in their children. Seymour (1987) acknowledged the difficulty parents have ignoring disruptive crying and reported that in three of his four cases the

parents did not adhere closely to the prescribed procedures. This resulted in a prolonged period before the extinction programme achieved a successful outcome. Weir and Dinnick (1988) reported that Health Visitors frequently find parents unwilling to leave their infants crying without attention, and Rickert and Johnson(1988) lost a number of potential subjects in their study because of the parents' refusal to ignore their children.

These problems were apparent in Study One where five of the seven children had been previously left to cry, resulting, presumably, in sleep disturbance which would be resistant to extinction. The high levels of compliance in this study may have reflected the intensive daily support offered to the parents by the researcher. This support was presumably not enough to prevent a higher level of non-compliance from the parents of two children with a consequently less favourable outcome. Some parents in this study were initially dubious about the procedure but responded to repeated explanation of its likely benefits. Although the parents in Study One commented, with hindsight, that the intensive approach was easier than a more gradual one, the question whether there is an alternative to an extinction procedure with its distress for parents and child must be asked.

The initial impetus for Study Three came from the researcher's clinical experience in a child and family clinic where a sedative (usually trimeprazine) was often prescribed in conjunction with an extinction programme in order to lessen the effect on the child and make the procedure more acceptable to parents. The belief of the medical practitioner who prescribed the medication was that the child would wake less often and go back to sleep more quickly after each awakening. A gradual decrease in the medication during the programme would provide chances for the child to learn from the

extinction programme while he or she was still drowsy enough to fall back to sleep with a minimum of crying.

This belief has never been empirically tested. It is possible that it may work in the manner described but also possible that the child's post extinction response burst would simply be delayed until the medication was at sub-therapeutic levels, consequently prolonging the parent's anxiety about the programme.

Study Two demonstrated that trimeprazine decreased sleep disturbance in infants but that this effect was short lived. As such this study's results are consistent with those of Richman (1985) and Simonoff and Stores (1987) who each concluded that its main role was in short-term relief for parents. Both of these articles and Study Two found that the response to the medication was not clinically significant. Study Two also highlighted the variability of response to the medication within each subject. A certain amount of sleep disturbance continues during treatment with trimeprazine. It is possible therefore, that the infant may be aware of the changes in his/her parents' behaviour resulting from an extinction programme, despite the decrease in the frequency and duration of awakenings resulting from the medication. If this is so then extinction may continue to be effective despite less awakening and less crying. This could answer many of the concerns raised by parents and the authors described above.

The purpose of Study Three was to use a double-blind study to evaluate whether the use of trimeprazine in conjunction with an extinction programme leads to less infant distress, and less parental anxiety, with the same effectiveness as an extinction programme on its own, or in conjunction with placebo.

Table 20 Subject Characteristics for Studies Three and Four

Characteristic	Medication Group (N=10)	Placebo Group (N=12)	Extinction Group (N=13)	Normal sleep Control Group (N=15)	Sleep disturbed Control Group(N=12)
Rural residence	30%	8.5%	8%	6%	42%
Urban residence	50%	83%	84%	86%	50%
Township residence	20%	8.5%	8%	6%	8%
Socioeconomic status	3[1]	4	3	4	3
	(2-6)	(2-8)	(1-5)	(3-6)	(1-6)
Mother work	0%	15%	20%	26%	33%
European	100%	100%	100%	94%	100%
Birth order	2	1.2	1.3	1.9	1.8
	(1-6)	(1-2)	(1-2)	(1-4)	(1-3)
Age	15.3 mo.	12.9mo.	14.6mo.	15.1	15.6
	(11-20mo.)	(7-20)	(8-27)	(6-24)	(8-22)
Female	50%	58%	50%	26%	50%
Younger Sibling	10%	0%	0%	0%	8%
Current medication	30%	33%	16%	40%	83%
Past medication[2]	70%	66%	66%		

[1] Elley and Irvine (1972)
[2] This information was only available for the treatment groups

11.2. METHOD

11.2.1. Subjects and Setting:

Subject characteristics for children in Studies Three and Four are presented in Table 20.

The subjects were 45 infants referred to the Canterbury Sleep Project in the manner described in Chapter Eight and accepted after the screening interview. The original intention was to take 45 consecutive referrals to the project and assign them randomly to an extinction group, an extinction plus trimeprazine group and an extinction plus placebo group. Unfortunately this was not possible because the Royal College of General Practitioners objected to the project's use of a general practitioner to prescribe sedatives to the patients of other general practitioners (see Appendix F). They wished individual practitioners to prescribe to their own patients. The Canterbury Branch of the New Zealand Plunket Society were concerned about the disagreement and continued to refer infants only if intervention was confined to behavioural approaches until the disagreement was resolved. Consequently the extinction group was collected first by taking consecutive referrals over this period and the medication groups were collected once the College had agreed to the continued involvement of the medical practitioner.

Although 15 children were assigned to each group, fewer children finally participated. Of the 15 infants assigned to the extinction group, one was withdrawn by his parents because they found the procedure too difficult to carry out and one mislaid the data sheets. Thirty infants were assigned to the medication groups. Because bottles were given out double-blind and the Pharmacist involved had provided spares, more placebo bottles were inadvertently given out than active medication bottles. Fourteen children were given active

medication and 16 were given placebo. After the medication was given out seven children were lost from the programme. Two had to be withdrawn because of serious illness, (not related to the programme), the data from three subjects was lost and a further two moved away and were unable to be contacted to retrieve complete sets of data. Four of these seven were from the active medication group and three from the placebo group. The final group numbers were 13 in the extinction group (extinction group), 12 in the placebo plus extinction group (placebo group) and 10 in the active medication plus extinction group (medication group).

11.2.2. Initial Assessment:

All parents were interviewed with their children following the procedure described in Chapter Eight. The aims of the study were explained and parents' agreement to take part was sought.

11.2.3. Design and Procedure:

The design was a groups design with allocation to the extinction plus placebo (placebo) group and allocation to the extinction plus active medication (medication) group being double blind. The third group was the extinction only (extinction) group. The rationale for the choice of groups was based on the fact that the comparisons were between groups experiencing different treatment regimes. The main group of interest was the medication group and whether the use of medication in conjunction with the extinction programme would result in different results on these measures than a group treated with extinction only. The extinction group, therefore, acted as a control group for this study with the placebo group being essential to ensure that any effects were results of the use of active medication only, and not the result of other variables such as parental expectations. The

expectation was that the placebo group and the extinction group would be more similar to each other than to the medication group.

Parents were told, during the first interview, that previous research had shown that behaviour management was effective in managing infant sleep disturbance and that the experimenter was also interested in collecting information on a wide variety of common child characteristics and parent reactions over time because there was little information available on these characteristics in infants. They were told that the child characteristics and parental reactions would be measured by several sets of the same questionnaires which they would fill in over the following 18 months.

The parents were often concerned that undergoing a behaviour programme would have an adverse effect on their child. (By this stage in the Canterbury Sleep Project, given the number of people who had been referred and the publicity surrounding the project, including two radio shows and media publicity, [see Appendix G.] it was rare for parents to not know something about the programme used and to raise this concern). This was handled by telling parents that there was also some evidence that any effect on the child could be beneficial. If parents asked whether this was the reason the questionnaires were given, this was answered truthfully. The aims of the programme were stated as further monitoring of the programme and the measurement of a wide variety of common child characteristics and parents' reactions over a considerable time of their child's development. It was stressed that very little research had been carried out with fathers compared to mothers and fathers were encouraged to be fully involved The parents of infants in the medication and placebo groups were further told that the study was interested in finding whether the use of a mild sedative would increase the effectiveness of the programme, that the experimenter had had some experience with this approach but there was no

research on it. The double-blind nature of the allocation to the groups was described so that all parents knew that their child might receive placebo. The importance of this approach for good research was stressed.

The 45 who were accepted and willing to take part were then asked to collect baseline data, fill in the first set of questionnaires which consisted of one State/Trait Anxiety Scale (Spielberger, Gorsuch & Lushene, 1970) for each parent, and the Flint Infant Security Scale (Flint) (Flint 1974) to be filled in by the parents regarding their child. The parents of children who would be administered active medication or placebo, were requested to seek their General Practitioner's agreement for the child to have medication prescribed by the medical practitioner involved in the study (see Appendix H). A further appointment was then arranged.

At the second interview, instructions for the administration of the medication and the behaviour programme were given. Infants were prescribed sugar syrup placebo (10mls) or trimeprazine (30mg in 10mls). This preparation was dilute compared with the commercial preparation Vallergan Forte which is 30mg in 5mls. (This had led to misunderstanding with the Royal College of General Practitioners, see Appendix F). The dose was dilute in order to facilitate the parents' graduation of the dose over 10 days as 2ml steps were considered easier to read than 1ml steps. Parents were instructed to decrease the dose by 2mls every two days over the first ten days of the behaviour programme.

The medication regime was therefore: days one and two, 10mls; days five and six, 6mls; days three and four, 8mls; days seven and eight, 4mls; days nine and ten, 2mls; subsequent days: no medication.

These instructions, and safety procedures, were formalized in a written contract (see Appendix I). The procedure for checking with someone who knew which medication each child was on, should it be

necessary, was emphasised. This information, and assistance with carrying out the programme was available 24 hours a day.

The extinction programme given to the parents was the same as that described in Chapter Nine.

At the second interview, the first set of questionnaires was collected and instructions for filling in the second set on the third day of intervention and for filling in the third set during the maintenance phase of the programme were given.

The parents were contacted by telephone during the intervention phase in the manner described in Chapter Nine. This provided an opportunity to check, verbally, the medication dose the child had received and that the questionnaires were filled in on the appropriate day. Parents were posted a description of the maintenance programme and another set of questionnaires after four weeks of intervention. The intervention programme and the necessity of filling in the questionnaires was also discussed with them on the telephone.

The original intention was to provide follow-up at 6 and 18 months to all groups, but because the experimenter suffered a prolonged illness subsequent to the intervention phase of the active medication and placebo groups, this was not possible. Several of the extinction group, received follow-up at six months. Any further follow-up for all groups could not be provided until eighteen months after the beginning of the active and placebo groups' intervention period. By this stage 24-30 months had passed for the extinction group with the exception of one child who began the extinction programme with the placebo and active medication groups. Consequently the children in the active medication and placebo groups received follow-up at 18 months after intervention. Of the nine children available for follow-up in the extinction group, four received follow-up at 6 months after intervention, one at eighteen months after intervention and four at 30

months after intervention. Follow-up consisted of a further set of questionnaires and two further weeks recording of each child's sleep.

Data recording was carried out by the parents using the Daily Sleep Diary described in Chapter Eight. The record sheets were completed daily during the baseline and the four weeks of the intervention phase and during the two weeks of follow-up. Questionnaires, which consisted of the Flint Infant Security Scale, and a State/Trait Anxiety Scale record sheet for each of the two parents (where appropriate) were filled in:

1. during baseline,
2. After the second night of intervention (when parent's anxiety was expected to be at its highest),
3. at the beginning of the maintenance phase,
4. during follow-up.

11.3. MEASURES

Measures of the infant's sleep behaviour were as described in Chapter Eight.

Measures of infants' and parent's reactions across the data gathering period were as follows:

11.3.1. Flint Infant Security Scale (Flint 1974):

This measure was chosen because of the paucity of measures available for this age group. The concept of "security" measured by this scale is based on Flint's (1974) belief that the mental health of an infant is based on the development of trust in his/her caretaker and the development of self trust which comes from having experienced his/her needs being met and his/her perception of the world as benign.

There are several problems with this scale. It is based on Flint's belief about infant security and it's expression only, without any content validity being supplied. It is possible, for example, that

professionals experienced with infants and their behaviour might interpret the behaviour of an infant receiving a high score, which is based on complete acceptance of care from the parent and changes in the environment, as being an expression of apathy on the infant's part, rather than security. The scale was validated on a group of infants who were in foster care and subsequently moved to adoptive homes. Flint does not acknowledge that this group may be different from a group of infants who here lived in a settled home from the start.

Despite these drawbacks the scale was used in this research for the reasons that:

1. There were no alternative scales available that did not need time consuming observation in order to be administered,
2. The scale covers a wide range of infant behaviours including eating, sleeping, toileting, social and playing behaviour, as well as behaviour in unfamiliar situations and physical experiences.
3. The scores on the scale received by Flint's sample were normally distributed, if positively skewed and hence the scale seems to provide a measure of infant behaviour which varies between individuals and which might be expected to show change over time.
4. When used in Flint's validation study, the scale was sensitive to changes in the infants' circumstances. When they were moved from foster homes to adoptive homes the infants showed the drop in security scores predicted by the author (Flint, 1974). After they had settled into their adoptive homes their security scores increased. There is some evidence therefore, that the Flint Infant Security Scale is sensitive to changes in infants normally associated with changes in security.

Because a group design was used for this present research any problems presented by the scale itself would affect each group in the same manner.

The Flint scale, was designed to be administered in an interview, and Flint (1974) specifies that the exact wording of the items should be given to parents with the interviewer facilitating comprehension when parents fail to understand the meaning of the questions. In the present study it was considered acceptable to give the items in questionnaire, rather than interview format since resources did not allow the use of the interview format (see Appendix J). Parents were encouraged to telephone the experimenter if they did not understand individual items.

The scale covers a wide range of infant behaviours, including sleep, with evidence of sleep disturbance rating on the scale as less infant security. Because sleep behaviours were specifically targeted for change in this study, it was possible that changes in sleep could influence Flint scores in a manner which would make it difficult to compare the groups security scores in a meaningful manner. For this reason scores on the scale were computed with the sleep items excluded, giving the sleep corrected sleep scores used in this study.

11.3.2. A-State Scale of the State-Trait Anxiety Questionnaire (STAI) (Spielberger et al., 1970):

The STAI was developed as a research instrument for investigating anxiety phenomena in "normal" (non-psychiatrically disturbed) adults although it has also been found to have some clinical applicability too. The full questionnaire has an A-Trait scale measuring" relatively stable individual differences in anxiety proneness" and an A-State scale measuring "transitory emotional state or condition... that is characterized by subjective, consciously perceived feelings of tension

and apprehension and heightened autonomic nervous system activity" (Speilberger et al, 1970 (p3)).

The A-State scale was used in this research to determine the impact of the sleep programme on parents, as it is recommended by Spielberger et al. (1970 (p3)) for use "to determine the actual levels of A-State intensity induced by stressful experimental procedures".

11.3.3. Reliability Assessment:

Table 21.
Reliability of parents records of frequency and duration measured against VAR and Fathers' reliability.

Child	Group	Frequency	Duration	Percent of records checked (number of nights)
1	Active	89%	85%	66%(42)
2	Placebo	100%	100%	16%(7)
3	Placebo	86%	84%	71%(30)
4[1]	Extinction	100%	100%	25%(14)
5[1]	Extinction	71%	41%	12.5%(6)
6	Extinction	100%	100%	7%(3) [2]
8	Extinction	80%	50%	18%(8) [3]

[1] Fathers' reliability

[2] More records were taken but were unusable owing to incorrect designation of nights on the Event Recorder sheets.

[3] Machine was removed after eight nights owing to the child's distressed reaction to it.

Because of limited resources in the availability of apparatus and time, reliability information could only be collected for eight of the 36

children included in the treatment groups. The results of the reliability measures on these subjects are presented in Table 21.

11.4. RESULTS

Data was analysed using a two way Analysis of Variance (ANOVA)[1] considering group membership and phases with repeated measures as well as the programme's test of simple effects. Where further statistical analysis was warranted, this was undertaken , by comparisons of specific pairs of means, using Tukey tests.

Data in the results section are summarized as group means and standard deviations. Where significant effects were computed, the data were graphed. Raw scores of individual subjects are presented in Appendix K.

11.4.1. Duration of Awakening:

Table 22.

Mean duration and standard deviation (S.D.) of awakening in minutes, across groups and phases

Group	Baseline	1st 10 days Intervention	2nd 10 days Intervention	3rd 10 days Intervention	Follow-up
Medication	29	13	11	7	2
(S.D.)	(18.3)	(10.8)	(7.9)	(8.25)	(4.6)
Placebo	36	33	14	7	3
(S.D.)	(18.3)	(17.3)	(15.3)	(6.08)	(4.69)
Extinction	21	25	7	9	5
(S.D.)	(11.48)	(18.9)	(8.46)	(9.49)	(11.55)

[1] CLR ANOVA (Clear Lake Research Incorporated, 1986)

Table 22 and Figure 17 present the mean duration of awakening each night for the three treatment groups across four phases that is: baseline, the first 10 days of intervention, the second ten days of intervention, the third ten days of intervention and follow-up.

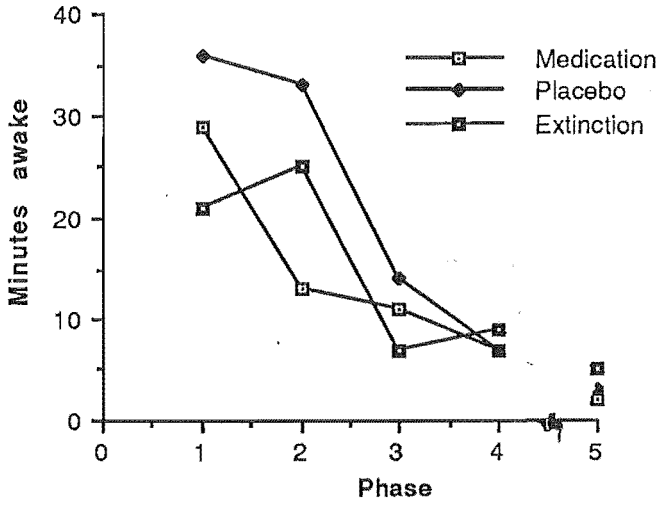


Figure 17. Mean duration of awakening across groups and phases. Key: 1 = Baseline; 2 = First 10 days of intervention; 3 = Second 10 days of intervention; 4 = Third 10 days of intervention; 5 = Follow-up.

Subjects in the placebo group woke longer, on average, than those in the medication group who, in turn, woke longer than the extinction group at baseline, but these differences were not significant. Subjects in all groups reduced the duration of their awakening over the four phases (phase main effect F 28.12, df = 3,96, p<.0001) but there were no differences between the groups. The significant interaction (F = 2.697, df = 6,96, p = .0183) can be interpreted by considering the simple effects which revealed that the decrease in awakening for all groups across the five phases was significant but that there was a significant difference between the groups at the first intervention phase. The mean time awake in the medication group was lower than that of the other two groups. A one way ANOVA and subsequent Tukey test described a significant difference (p< .01) between the medication

group and the placebo group at this phase but not between any other groups.

11.4.2. Number of Awakenings

Table 23.

Mean nightly frequency of awakening and standard deviations (S.D.) across groups and phases

Group	Baseline	1st 10 days Intervention	2nd 10 days Intervention	3rd 10 days Intervention	Follow-up
Medication	2.8	.6	.8	.6	.3
(S.D.)	(1.39)	(.424)	(4.04)	(.46)	(.5)
Placebo	2.5	1.4	.5	.5	.4
(S.D.)	(1.39)	(.87)	(.338)	(.52)	(.43)
Extinction	1.4	1.0	.6	.7	.2
(S.D.)	(.71)	(.438)	(.35)	(.57)	(.210)

Table 23 and Figure 18 present the mean frequency of awakening each night for each of the three treatment groups across the four phases.

As for the duration data there was a trend, in baseline, for the subjects in the placebo group to wake more often than those in the medication group and for the subjects in the medication group to wake more often than the extinction group. These between group differences were not significant ($p = .06$). Subjects in all groups significantly reduced the frequency of awakening over time (phase main effect $F = 38.362$, $df = 4,104$, $p<.0001$). The interaction between group membership and phase was also significant ($F = 3.447$, $df = 8,104$, $p=.0015$). with the medication group subjects improving more in the first intervention phase than the other subjects did, although the

simple effects comparison showed this difference in this phase not to be significant (p = .06)

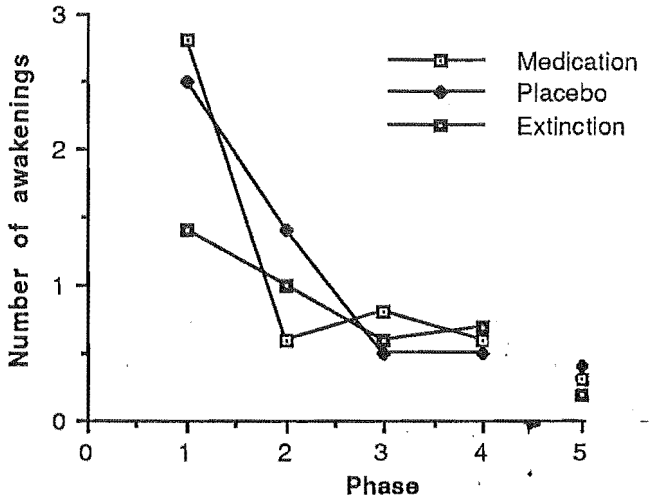


Figure 18. Mean frequency of awakening across groups and phases. Key: 1 = Baseline; 2 = First 10 days of intervention; 3 = Second 10 days of intervention; 4 = Third 10 days of intervention; 5 = Follow-up.

11.4.3. Flint Infant Security Scale

Table 24.

Mean sleep corrected Flint Infant Security Scale Scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd Day Intervention	Beginning Maintenance
Medication	30.1	40.0	39.4
(S.D.)	(9.8)	(6.32)	(9.7)
Placebo	25.2	34.0	32.6
(S.D.)	(18.5)	(12.95)	(10)
Extinction	30.7	32.8	37.3
(S.D.)	(7.2)	(7.18)	(8.47)

N.B. Flint scores which are ratios have been multiplied by 100 to make whole numbers. High scores indicate more security , maximum score is 55.

Table 24 and Figure 19 present mean sleep-corrected Flint scores for the three treatment groups across three phases namely; baseline, the third day of intervention and the beginning of the maintenance phase.

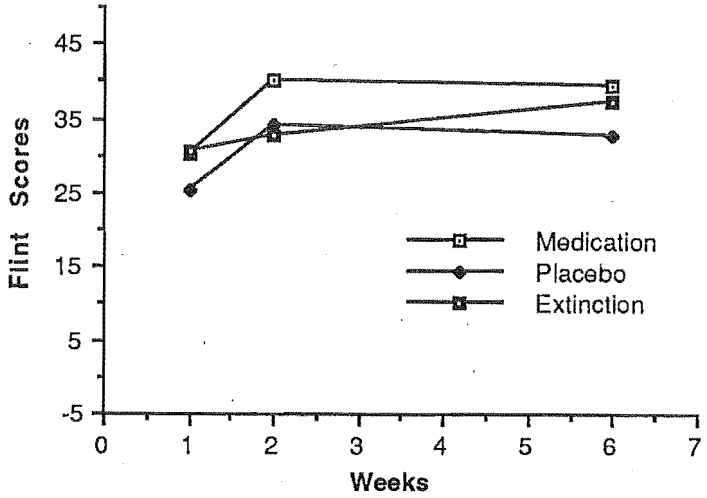


Figure 19. Mean sleep corrected Flint Infant Security Scale scores across groups and phases.

The mean placebo group score was lower, but not significantly so, indicating less security in this than in the other two groups at baseline. Overall, there were no significant between group differences but there was a significant increase in security over time ($F = 11.892$, df 2, 64, $p<.0001$). A pairwise comparison of the phases using a Tukey test showed that scores were significantly increased (indicating an increase in security) for all groups at the two intervention phases compared with baseline ($p<.01$). No other pairwise comparisons were significant.

11.4.4. State Anxiety :

11.4.4.1. Mothers:

Table 25.

Mothers' mean State Anxiety Scores

and Standard deviations (S.D.) across groups and phases.

Group	Baseline	3rd Day Intervention	Beginning Maintenance	Follow-up
Medication	38.1	33.7	27.6	30.2
(S.D.)	(9.1)	(7.9)	(2.95)	(6.42)
Placebo	43.5	37.4	37.1	39.0
(S.D.)	(8.03)	(6.4)	(4.2)	(8.4)
Extinction	37.6	33.1	30.4	31.8
(S.D.)	(5.5)	(6.5)	(8.47)	(7.6)

N.B. higher score indicates more State Anxiety, maximum score is 80.

Table 25 and Figure 20 present mean A-State scores for the mothers of the three treatment groups across four phases being; baseline, third day of intervention, beginning of maintenance and follow-up.

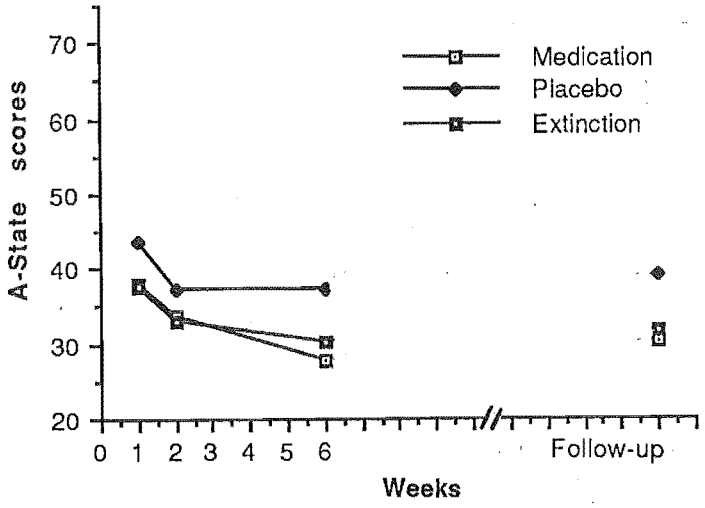


Figure 20. Mothers' mean A-State scores across groups and phases.

All mean scores were within one standard deviation of mean scores for New Zealand females aged between 20 and 39 years of age (Knight, Waal-Manning & Spears, 1983) with the possible exception of the placebo group mothers at baseline whose mean scores were just within one standard deviation from the mean for females 30-39 years of age, but were outside one standard deviation from the mean for females between 20-29 years of age. This higher state anxiety evidenced by the placebo group mothers at baseline was not significantly different from the other groups. There was a significant group main effect ($F = 4.547$, df, 2, 72, $p = .0212$). Consideration of the simple effects contributing to the main effect showed that the placebo group mothers differed significantly across phases from both the other groups ($F = 4.839$, df,3, 72, $p = .004$) in that while not significantly different from the other groups at baseline the placebo group mothers decreased their scores less than those of the other two groups. There was also a significant phase main effect ($F = 8.180$, df, 3, 72, $p = .0001$), indicating an overall decrease in anxiety with time. There was a trend for the A-State scores to have increased for all groups at follow-up but a further ANOVA comparing the second intervention phase with the follow-up phase showed that this difference was not significant.

11.4.4.2. Fathers:

Table 26.

Fathers' mean State Anxiety Scores

and standard deviations (S.D.) across groups and phases.

Group	Baseline	3rd Day Intervention	End Intervention	Follow-up
Medication	32.1	32.6	32.1	37.1
(S.D.)	(5.5)	(5.4)	(5.56)	(11)
Placebo	34.8	30.6	32.5	35.6
(S.D.)	(8.9)	(6.98)	(7.72)	(9.6)
Extinction	32.8	31.6	29.7	33.1
(S.D.)	(8.2)	(7.5)	(7.46)	(8.6)

N.B. higher score indicates more anxiety, maximum score is 80.

Table 26 and Figure 21 present mean A-State scores for the fathers of the three treatment groups across the four phases.

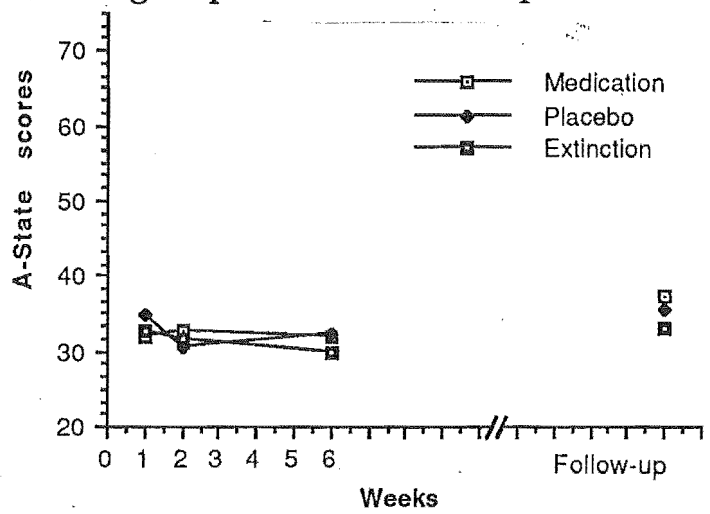


Figure 21. Fathers' mean A-State scores across groups and phases.

All mean scores were within one standard deviation of mean scores for New Zealand males aged 20-39 (Knight et al., 1983). There were no significant differences between the A-State scores of the fathers of

the three groups at baseline nor at any other time during the data gathering period. Neither were there any significant differences in Father's A-State scores across the phases.

11.5. DISCUSSION

This study aimed to establish whether the use of trimeprazine in conjunction with an extinction programme would moderate the effects of the programme by reducing infant awakening and crying in the group given active medication during the programme, leading to higher infant security scores and less parental anxiety. Another possibility was that rather than the treatment producing an immediate decrease in infant and parental distress, reactions such as the post extinction response burst could merely be delayed. A delayed increase in the frequency and duration of awakening along with an increase in parental State Anxiety and decrease of infant security scores would then be evident during the second or third intervention periods.

Subjects in all groups responded positively to the extinction programme by demonstrating a marked decrease in sleep disturbance, over the programme. This effect was maintained at follow-up and reflects the same general response as described in Study One.

There was some evidence that the use of Trimeprazine in conjunction with an extinction programme led to less infant awakening and crying over the programme than extinction with placebo or on its own. There was a trend for the active medication group to wake and cry less than the other groups during the first part of the extinction programme although this difference was only significant when the active medication group was compared to the

placebo group. At no point in the intervention did the active medication group wake and cry more than the other two groups.

At no point during the data gathering period did the groups differ from each other on the Flint Infant Security Scale. All groups, however, showed significant improvements over the intervention period which were maintained at follow-up. Although the use of trimeprazine did not lead to a difference in security scores between the two groups it is clear that treatment by an extinction programme does not lead to any decrease in infant security as some authors (e.g., Elizabeth, 1988) predict.

Parental State Anxiety scores for all groups were within or close to one standard deviation of population means. Results across the intervention period varied, depending on the gender of the parent, with fathers' scores remaining stable across the whole data gathering period but mothers' scores decreasing over the intervention period. This result is probably indicative of a difference in roles regarding infant care, between the parents. There was a slight recovery of mothers' A-State scores by follow-up but this trend was not significant. Again there is no evidence that the use of trimeprazine in conjunction with an extinction programme leads to less State Anxiety in mothers but mothers' State Anxiety clearly decreases as a result of treatment of their children's sleep disturbance. This pattern was different from what was expected, in that the mother's anxiety did not peak after the second night of the programme during the apparently most stressful time of the intervention. There are two possible explanations for this finding. Firstly it is possible that the most stressful time is earlier in the intervention, during the first night of the programme for example. The positive effects of the intervention could have been obvious to the mothers by the morning of the third day. Secondly, it was impossible to obtain a true baseline measure of parental state anxiety as all the parents filled in the

questionnaires after their decision to take part in a programme to modify their children's sleep. Although they were not aware of the details of the intervention during baseline, considerable publicity about the programme had heightened the public's awareness that it might be stressful. The initial contact with a professional and subsequent data gathering is likely, in and of itself, to be stressful. The scores at baseline, therefore, may have been elevated because of the parents' (or at least the mothers') anticipatory anxiety which, in the case of the mothers, decreased once the programme was under way.

The differences between the subjects in the placebo group and those in the other groups raises questions regarding the nature of this group. There was a trend for mothers in this group to evidence higher State Anxiety than mothers in the other two groups at baseline. Maternal anxiety for the placebo group, although decreasing significantly across phases, did not decrease as markedly as the other two groups. Children in the placebo group woke more often and for longer periods than children in the active medication group during the first intervention phase. Children in neither group differed significantly from those in the extinction only group (which scored midway between the other two). In addition to this, on the other measures at baseline there was a non-significant trend for the placebo group to have higher scores on sleep disturbance, and lower infant security scores.

One explanation for the placebo group's differences might be a change in the nature of referrals to the Canterbury Sleep Project over time. There was considerable publicity for the Canterbury Sleep Project and inevitably some details of the intervention programme were spread by word of mouth. It was possible that less severe cases came to be handled by parents themselves, general practitioners or plunket nurses with later referrals to the Project having more severe problems than earlier ones. This would explain the differences

between both medication groups and the extinction group, given that the extinction group was recruited first, but does not explain the differences between the placebo group and the active medication group since these subjects were recruited at the same time. Baseline scores of the active medication group fell between the extinction and placebo group on all measures. It is possible that the extinction group was different because of a change in severity of the referrals and that the differences between the active medication group and the placebo group was merely the result of sampling error. The fact that maternal State Anxiety decreased more markedly for the active medication group than for the placebo group could have been the result of the greater decrease in sleep disturbance evidenced by the infants treated with the active medication. The fact that mothers in the placebo group evidenced less change in State Anxiety over the intervention period could have reflected a tendency for placebo group mothers to remain somewhat agitated when it was apparent that the medication was not working. Spontaneous comments by parents in both the placebo group and the active medication group indicated that parents knew which group they were in from their children's responses to the medication . The other possible explanation for the differences between the placebo groups and the other groups is sampling error alone. Consideration of the subject characteristics (Table 20) fails to indicate any clear evidence of sampling error. Although the groups do differ on a number of factors it is as likely for the placebo group to be similar to the extinction group than to differ from it as it does on the experimental measures. The one subject characteristic, however, that does differentiate the placebo group from the other groups is infant age, where the infants in the placebo group are younger over-all than the other two groups. It is possible that the differences noted are a function of the children in the placebo group being younger overall. Younger infants may have more severe

sleep disturbance and this may impact on their security scores and maternal anxiety scores. Mothers of younger children may also be more anxious, independent of sleep disturbance.

Although the trend of the data was to favour the use of trimeprazine in conjunction with an extinction programme, there were problems with its use. These are summarized by the comments of the mother of one active medication group child who commented on the questionnaires which she filled in on the morning of the third day " I really hope this stage is over soon. It's horrible to see her so doped up during the day." Many other parents commented on their children's response to the medication describing day-time subdued behaviour in their child during the first few days of the medication regime.

Although no consumer evaluation was carried out in this study, many of the active medication-group parents spontaneously commented that although the chance of receiving active medication had made the prospect of the programme appear easier and that they had been pleased to realize on the first few days of the programme that their child had been given the active medication, with hindsight they would have preferred to get the procedure over more rapidly by undergoing the programme without the medication.

In conclusion, there is some evidence that the use of trimeprazine in conjunction with an extinction programme leads to less awakening and crying during the extinction procedure but this effect is not great enough to lead to a reliably significant improvement in outcome. There is no evidence that the use of trimeprazine leads to higher scores on measures of infant security or to reduced parental anxiety. The major advantage to the combination treatment is that it gives an alternative to parents, who are concerned about the use of extinction alone. The parents of some children, however, describe side effects of

the medication and some parents claim, with hindsight, that they would have preferred an unmodified extinction programme.

One interesting finding from this study is that maternal state anxiety decreases and infant security increases over the intervention period of an extinction programme. This begins to answer criticisms of extinction based on its putative detrimental effects on infants and parents but requires further investigation.

The hypotheses presented in Chapter Seven have been indirectly addressed in this discussion section. Table 27 refers formally to each hypothesis regarding whether it was supported or not.

Table 27.

Summary of hypotheses and outcome

HYPOTHESIS	OUTCOME
S3,H1: That there would be significant reductions in sleep disturbance measures for groups treated with extinction solely, or extinction plus either trimeprazine or placebo.	++
S3.H2: That changes in all groups would be maintained over time.	++
S3,H3: That there would be significantly less crying from infants treated with extinction plus trimeprazine than infants treated either with extinction on its own or extinction plus placebo	+There was a trend in this direction which was significant only when the active medication and placebo groups were compared.

S3,H4: That the security of infants treated with extinction plus trimeprazine would be higher during the intervention period than that of infants treated either with extinction on its own or extinction plus placebo.	- Children in all groups increased their security scores over intervention.
S3,H5: That parental anxiety would increase in all extinction groups over the first few days of intervention period	- Maternal state anxiety decreased over the first few days of the intervention period. Paternal state anxiety did not change.
S3,H6: That parental state anxiety during the intervention period would be less in parents of children treated with extinction in conjunction with trimeprazine than mothersthe other groups.	- Mothers of both the active medication and extinction groups decreased their state anxiety more than of the placebo group

N.B. ++ denotes support for the hypothesis, + denotes qualified support and - denotes that the hypothesis was not supported.

CHAPTER TWELVE

STUDY FOUR

12.1. INTRODUCTION

Study Four sought answers to the question: "Is the use of extinction with sleep disturbed infants harmful to the child or his/her family?" A number of previous writers have suggested it is, sometimes using extreme language. Kirkland (1985), for instance, likens the use of extinction with sleep disturbed infants to torture. Lask (1981) states that it causes problems without specifying what these problems are, Elizabeth (1988) clearly describes a variety of negative outcomes, while other authors, such as the La Leche League International (1981), advise against its use without being specific about the reasons why.

There has been no systematic investigation of whether extinction leads to negative side effects in infants, and very little in older children. Rapoff et al. (1982) found that half of the six pre-school children whose sleep onset delay and bed-time delay they treated with a combination of reinforcement, extinction and punishment, experienced fluctuating levels of crying and whinging following treatment. Sanders et al. (1984) used the Child Behaviour Problem Checklist (Patterson et al., (1975) in order to indicate whether there were any negative side effects to their programme. They taught parents to use a combination of stimulus control, planned ignoring (extinction), time out and reinforcement to manage bed-time disruptions in pre-school children. They found a slight reduction in the number of problem behaviours in three of their four subjects and

concluded that there were no negative side effects of treatment and, if anything, that the trend was in the opposite direction.

Richman et al. (1985), Seymour, Bayfield et al. (1983), and Seymour (1987) also describe some beneficial changes in the children treated with behavioural techniques, including extinction, in their studies. These issues are described further in Chapter Five above.

Although negative comments about the use of extinction can be countered by pointing out that many parents attempt to use extinction regardless of whether its use is advocated by professionals or not (see Chapter Five), the fact remains that there has been no systematic investigation of the side-effects on infants of using extinction to modify sleep disturbance. Study Four attempts to address this issue.

The use of extinction procedures with sleep disturbed infants may impact on the child in two ways. Firstly there is the direct and immediate distress caused to the child by the procedure at the time it is used. Although this was reflected in the duration of crying measure during the intervention phase in Study Three, distress was not the most predominant concern of that study. The second way in which the use of extinction can impact on the child through more lasting effects such as the impact on the infant's feelings of security, fear and helplessness predicted by critics of extinction such as Elizabeth (1988).

There are considerable difficulties assessing such adverse effects since it is very difficult to measure feelings, as such, in infants except by measuring their behaviour. An infant who is insecure, fearful and helpless presumably behaves differently from his or her more secure peers. Furthermore, because it is possible that the use of extinction with sleep disturbed infants may have beneficial, rather than detrimental effects, including effects on personality, adjustment and quality of family relationships, it is important that a wide range of infant behaviours is measured.

Study Four, therefore, aimed to evaluate changes in infants treated with extinction for sleep disturbance. These infants were compared to a non-treated sleep disturbed control group and a normal sleep control group over an extended period. Changes are measured using the Flint Infant Security Scale (Flint) (Flint 1974) as a measure of infant security as well as eight relevant factors from the Child Behaviour Characteristics Scale (CBC) (Borgatta & Fanshel, 1970) in order to cover a wide range of infant behaviours.

12.2. METHOD

12.2.1. Subjects:

12.2.1.1. Experimental groups:

The subjects for the experimental groups were the children in the three treatment groups described in Study Three. Additional data used in this study was gathered at the same time as the intervention reported in Study Three.

12.2.1.2. Control groups:

The subjects from the control groups were recruited from one urban and one semi-rural medical practice in Christchurch. The practices were selected because of the wide range of residential areas they served. The receptionists were given an information sheet (see Appendix L) and asked to approach every person, male and female, who came to the practice during the two week recruitment period, who had a child between six months and two years of age, regardless of whether the child was with them. This was an attempt to ensure that the control children were not solely those children who had been taken to their General Practitioner. The parents were then asked if they would be willing to consider taking part in a survey of common child behaviours and parents' reactions. They were also given an

information sheet (Appendix L). It was stressed that they did not have to decide immediately but if they were willing to consider taking part they could discuss it with a research assistant. This was to avoid the receptionists having to answer questions about the study that they were not equipped to answer. Because it was important to exclude infants who had undergone an extinction programme for sleep disturbance, the interest in infant sleep had to be declared. However it was stressed that this was only one of the behaviours of interest in this study.

Specific details regarding the people approached who did not take part are not available but receptionists from both practices reported agreement to consider taking part from in excess of 80% of those approached.

Thirty two names were collected by the receptionists. Of these, the parents of one child decided not to take part, one child was eliminated because of a developmental delay and one was eliminated after return of the questionnaires because her parents had apparently alternated which of their two children they referred to in filling out the questionnaires. Another child was eliminated at this point because only half the questionnaires were filled in.

The 28 children who were left were assigned to sleep disturbed and normal sleep control groups on the basis of an average of their SBS results. The SBS was given with the first and third questionnaires. An average SBS score greater than 4 was chosen as the lower limit for a child to be assigned to the sleep disturbed group. This figure was chosen because it gave a reasonable margin above Richman's (1985) criterion of 2.8 as being an average SBS score for children who are sleeping well. In order to achieve a score of 4 on the SBS the infant had to be awakening more than once or twice a week and also would have to have some other sleep disturbance. The lowest SBS score achieved in baseline by any subject in the experimental groups was 5.

The final numbers for the control groups were 15 in the normal sleep control group and 13 in the sleep-disturbed control group.

12.2.2. Initial Assessment

The initial assessment for the experimental groups was as described in Study Three.

The initial assessment of the control groups consisted of a telephone interview which covered basic demographic information (see Table 20 Chapter Eleven) and the child's medical history in order to exclude any children with serious medical or developmental conditions.

Assignment of control children to the sleep disturbed and normal sleep groups was based on an average score on the first two administrations of the Sleep Questionnaire (see Appendix M) which contained the SBS criteria in questionnaire format, with addition of a question on medication use, as they pertained to the week in question. The sleep questionnaire was administered to the control families during the time periods equivalent to baseline in the experimental groups and to the beginning of the maintenance phase for the experimental groups.

12.2.3. Procedure:

The procedure for the experimental groups was as described in Study Three.

The procedure for the control groups was as follows: After first contact the control groups were given the first set of questionnaires and asked to fill them in during the following few days. These questionnaires were personally collected and a second set given to be filled in three days later. These questionnaires were posted back after a telephone call had verified that they had been completed on the appropriate day. A further set of questionnaires were given four

weeks after the second were filled in. These were posted back. A final set of questionnaires were posted out and completed during the follow-up period. The order and timing of questionnaire administration is described in Table 28.

Table 28.

Chronology of questionnaire administration for Study Four:

Groups	Weeks 1-2	Third day of intervention	Beginning of maintenance	Follow-up
Experimental	DSD[1] Flint CBC	DSD Flint CBC	DSD Flint CBC	DSD - CBC
Control	SBS[2] Flint CBC	Flint CBC	SBS Flint CBC	SBS Flint CBC

[1] Daily Sleep Dairy

[2] Sleep Questionnaire.

12.3. MEASURES

The measures for this study were sleep-corrected scores on the Flint Infant Security Scale (Flint, 1974) which is fully described in Chapter Eleven, and the Child Behaviour Characteristics Scale (CBC) (Borgatta and Fanshel 1970)

12.3.1. Child Behaviour Characteristics Scale (CBC) (Borgatta & Fanshel 1970):

12.3.1.1. Description of the scale:

This instrument was designed for use the in longitudinal assessment of children from infancy to late adolescence. It considers a variety of

child characteristics which have been shown to have stability over time. The original CBC form was based on a number of factor-analytic studies incorporating large numbers of older children (Borgatta & Cautely, 1966; Borgatta & Fanshel 1965; Fanshel, Hylton & Borgatta, 1963). The scale used in this research is based on the Revised Age-specific Forms described by Borgatta and Fanshel (1970) where the original scale was extended for use with infants and young children.

The CBC takes the following forms: The children in this research used the first 60 questions which comprise 37 items applicable to all infants and a further 23 items applicable to all infants from 2 months to 2 years of age (see Appendix N). If used with older children the questionnaire can be extended by the addition of a further 55 items relevant for verbally fluent children from 2-17+ years of age, with some systematic variation of content for children over 7 years of age.

Of prime concern to Borgatta and Fanshel (1970) was the notion that any factor that existed in the earliest age group should should be carried through all the other age groups. With this in mind, they factor-analysed their scale to sum the items into 27 component scores. All component scores which apply to the infancy and early childhood groups apply to the general childhood group too. Some component scores are derived from items which apply only to older children. These component scores, of course, apply only to older children. The component scores were further factor-analysed to be consolidated into 16 composite scores, eight of which are applicable to the age group considered in this study. A description of these composite scores and the component scores which comprise them is given in Table 29.

Table 29

Applicable Composite Scores (CS) of the Child Behaviour Characteristics Scale their component scores and relevant questionnaire items

Composite Score	Component Scores	Questionnaire items
CSIa[1] Alertness/ Attention/Curiosity	Alertness	2. Is alert. 28. Is bright. 56. Is smart (bright).
	Attention/Curiosity	4. Is interested in what's going on. 17. Is curious about things around him/her. 23. Pays attention to things going on.
CSII Learning Difficulty	Distractibility	42. Gets distracted easily. 57. Loses interest in things easily.
	Learning Difficulty	44. Is slow to understand people. 59. Has difficulty learning things.
CSV Agreeableness	Cooperativeness	46. Is cooperative. 53. Is easy to train. 58. Does what people want him/her to. 60. Is patient.
	Compliance	29. Is easily quieted or calmed down. 34. Is easily taken care of. 36. Is easily satisfied or pacified.
	Agreeableness	5. Has a nice disposition. 25. Is agreeable.
CSVII Likeability[2]	Likeability	3. Is friendly. 6. Is likeable. 7. Is cheerful. 13. Is pleasant. 14. Laughs 16. Shows warmth and affection. 21. Smiles.

Table 29 continued

Composite Score	Component Scores	Questionnaire items
	Gloomy/sourness	18. Is gloomy or sad looking. 24. Appears sulky or sour. 54. Is moody.
CSVIII Emotionality/ Tension	Irritability/Tension	12. Is fidgety. 15. Gets upset easily. 22. Is tense. 27. Is irritable 30. Is restless. 35. Fusses and frets. 37. Gets over-excited easily.
	Tension/Anxiety	38. Is fearful, anxious. 45. Is overly emotional. 48. Is very tense. 52. Is overly nervous.
CSXa Withdrawal	Withdrawal	39. Rejects strangers. 41. Does not warm up to people. 47. Withdraws from people. 51. Is cautious with strangers.
CSXI Appetite	Appetite	10. Has a good appetite. 26. Eats well.
CSXV Activity	Activity	1. Is physically active, vigorous. 20. Has lots of pep and energy.

[1] Lower case "a" beside a Composite Score indicates that a sub-factor suitable for the age group has been used in this study.

[2] CSVII Likeability is the only Composite Score which is derived from subtraction, rather than addition of the component scores.

12.3.1.2. Ability of the scale to detect changes:

The CBC was able to discriminate between children placed in foster care for different reasons (Fanshel, 1975; Fanshel & Shinn, 1975). For example, children entering foster care because of their own behavioural difficulties score differently on the composite scores than

children entering foster care because of the physical illness of the child caring person (Fanshel & Shinn, 1975). These authors also found a fair degree of validity when results on the CBC scales were correlated with an examining psychologist's assessment of the emotional condition of the subjects over five years. There was also significant correlation between CBC results and teachers' assessments, where content of the rating instrument was similar. These authors also found that the scale was sensitive to positive change in foster children which came as a result of several factors.

Although investigation of the validity of the CBC has been confined to school age children there is evidence that these scales are suitable for the purpose of this research. They can discriminate between children who present in different ways and, although showing considerable stability over time (Fanshel & Shinn, 1975) are sensitive to changes in children's presentation.

12.3.1.3. Interpretation of changes:

These Composite Scores on the CBC cover a range of infant behaviours over which the instrument is sensitive to change, but the authors do not provide information on the interpretation of scores in terms of whether a particular score on a scale is more or less desirable for the child's adjustment than another score. Nor is there information given on which direction scores should take to denote negative effects and which direction scores should take to denote positive effects. Procedural decisions regarding interpretation therefore had to be made. These were straightforward in the case of all the Composite Scores except CSXV, Activity. These decisions are summarized in Table 30. In the case of CSXV Activity, it is possible that an increase towards overactivity could be viewed as a negative effect as could a decrease towards underactivity. It was decided to interpret any changes in this factor on the basis of the quality of the groups' overall scores and response to treatment.

Table 30

Interpretation of changes in Composite Scores

Composite Score	Positive	Negative
CSIa	Towards more Alertness/ Attention/Curiosity	Towards less Alertness/ Attention/Curiosity
CSII	Towards less Learning Difficulty	Towards more Learning Difficulty
CSV	Toward more Agreeableness	Towards less Agreeableness
CSVII	Towards more Likeability	Towards less Likeability
CSVIII	Toward less Emotionality/ Tension	Towards more Emotionality/ Tension
CSXa	Towards less Withdrawal	Towards more Withdrawal
CSXI	Towards more Appetite	Towards less Appetite
CSXV	Open to interpretation	Open to interpretation

12.4. ANALYSIS OF THE DATA

The necessity of considering the Flint data and each of the CBC results separately over five groups and four phases led to a risk of finding false significant results merely as a function of the large number of analyses required (Type I error). Attention was paid therefore, to reducing the number of analyses required. The steps taken and their rationale are presented below.

1. The number of groups was reduced from five to three on the basis of SBS scores. Given that the primary dependent variable in this series of studies has been sleep behaviour, the groups were considered on this basis. If the treatment groups did not differ significantly from each other on this variable despite the slight differences in their

management, it was considered acceptable to combine them as one group. Similarly, if the assignment of the control groups to sleep disturbed and normal sleep groups did not represent statistically significant differences in sleep disturbance then it would be acceptable to consider the controls as one group. A two way Analysis of Variance (ANOVA) considering group membership and phases with repeated measures was performed on the three treatment groups and the two control groups across SBS scores for the baseline, beginning of maintenance and follow-up phases.

Table 31.

SBS mean scores and standard deviations (S.D.)across groups and phases.

Group	Baseline	Beginning Maintenance	Follow-up
Medication	10.2	5.1	2.3
(S.D.)	(2.19)	(1.36)	(1.58)
Placebo	12.5	4.2	3.1
(S.D.)	(3.4)	(2.18)	(1.89)
Extinction	10.3	3.9	2.5
(S.D.)	(3.46)	(1.86)	(1.64)
N.S. Control	2.5	3.1	2.3
(S.D.)	(1.26)	(1.5)	(1.24)
S.D Control	7.1	6.2	5.8
(S.D.)	(1.6)	(1.71)	(1.83)

N.B. higher score indicates more sleep disturbance, maximum score is 24.

SBS scores for individual subjects is presented in Appendix O. Table 31 and Figure 22 present mean SBS scores across medication,

placebo, extinction, normal sleep control (N.S. control) and sleep disturbed control (S.D. control) groups and three phases being baseline, beginning of maintenance and follow-up respectively.

Considering only baseline scores, a Tukey test comparison revealed that the sleep disturbed controls scored significantly worse than the non- sleep disturbed controls ($p < .01$), and that the placebo group was the only treatment group to score significantly worse than the sleep disturbed controls ($p < .05$). The normal sleep control group's mean score was significantly better than all other groups ($p<.01$). There were no significant differences between the three treatment groups.

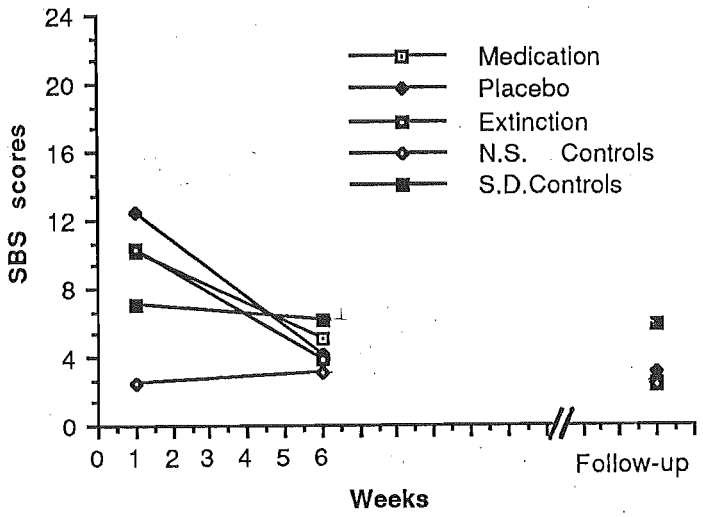


Figure 22. Mean Sleep Behaviour Scale scores across groups and phases.

Analysis of SBS scores across all five groups showed that the groups differed significantly ($F = 12.968$, df, 4, 44, $p<.0001$) and that the trend for scores to reduce over phases was significant ($F = 87.915$, df,2,88, $p<.0001$). There was also a significant interaction effect ($F = 12.453$, df, 8, 88, $p<.0001$). Pairwise comparisons of group means revealed that the normal sleep control group scored significantly lower than all the other groups ($p<.01$).

Closer examination of the simple effects contributing to the interaction effect disclosed that only the three treatment groups changed their scores significantly over the phases whereas there were differences between the groups at all phases. The differences at baseline are described above. A Tukey test comparison on all the groups at the beginning of the maintenance phase and at follow-up demonstrated that the sleep disturbed control group scored significantly worse than the other groups ($p<.01$) at both points although at follow-up the difference between the sleep disturbed controls and the extinction group was significant at the $p = .05$ level only.

On the basis of these analyses, which demonstrated very few differences between the three treatment groups over the data gathering period, the three treatment groups were combined to form one group (the treatment group). There were major differences between the sleep disturbed controls and the normal sleep controls which were therefore left as two groups (the normal sleep controls and the sleep disturbed controls) and considered separately for each analysis.

2. Analyses were conducted over both intervention and follow-up data sets only when the analysis on the follow-up data set failed to produce significant effects. Because of the extended time over which data was collected it was likely that a number of subjects would be lost to follow-up while still providing complete data for the first three phases. The data from these subjects had to be deleted in order to run analyses across all four phases. Consideration of the data across all subjects and the first three phases, however, would provide a more powerful test of effects given the larger number of subjects. It was

considered likely that differences at follow-up would reflect minor, developmental changes in measures only and that effects occurring across the intervention period only may be obscured by inclusion of minor changes in a fourth phase. The most conservative test, therefore was to consider all measures with the follow-up measures included. It is likely that any significant changes across the intervention period would be underestimated, rather than overestimated given this procedure. The analysis with the larger N was used only if the less powerful test failed to demonstrate results.

3. In all cases the data was analysed using a two way ANOVA with repeated measures, as well as a test of simple effects which gave information regarding differences between the groups, at baseline for example, which may not have been apparent on the ANOVA. Additional statistical analyses, were performed only following the discovery of significant effects. In cases where a significant difference in means across groups or phases occurred the first step in understanding the effect was visual analysis of the trend and level of mean scores on a graph. Where warranted, further statistical analysis was undertaken, by comparison of specific pairs of means using Tukey tests.

The examination of significant interactions was considered important in this study given that some of the groups could be expected to become more like each other over the time of the experiment. In this situation it is possible that initially significant differences would be attenuated over time. The hypothesis being tested was, therefore, that there would be a significant interaction rather than a significant main effect.

12.5. RESULTS

Data in the results section is summarized as means and standard deviations. Where significant effects are present the data is graphed. Raw data of individual subjects is presented in Appendix O.

12.5.1. Flint Infant Security Scale

Table 32.
mean sleep-corrected Flint Infant Security Scale
scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd Day Intervention	Beginning Maintenance
Treatment	28.6	32.2	36.2
(S.D.)	(13.0)	(9.86)	(9.6)
N.S.. Controls	33.7	33.7	32.1
(S,D.)	(12.0)	(9.8)	(9.02)
S.D. Controls	34.8	39.8	36.9
(S.D.)	(6.0)	(4.8)	(6.6)

N.B. Higher score indicates more security , maximum score is 55.

Table 32 and Figure 23 present mean sleep-corrected Flint scores across the three groups and three phases being baseline, third day of intervention and the beginning of maintenance.

Subjects from both control groups gained higher sleep-corrected security scores than the treatment group at baseline but this difference was not statistically significant. The mean score for all groups, at

baseline, was below the optimum range of 35-44 suggested by Flint (1974) as being the normal range of mental health for an infant and above the lower score of 20 which she suggests warrants immediate intervention. The sleep disturbed control group, however, was only very slightly below the optimum range. Inspection of the raw data showed that, at baseline, 6 of the 35 treatment group subjects scored below Flint's cut off of 20, whereas only 1 of the 15 normal sleep control group and none of the 13 sleep disturbed control group scored below this point. Subjects in the treatment group and the sleep disturbed control group increased their security scores between the baseline and first intervention phase. This improvement continued for the treatment group which scored within the optimum range at the beginning of the maintenance phase. These changes resulted in a significant difference across the phases ($F = 4.620$, df, 2,118, $p = .0117$) where a subsequent Tukey analysis showed that the baseline phase was significantly different from the first phase ($p<.05$) and the second intervention phase ($p<.01$). There was also a significant interaction effect ($F = 2.985$, df,4 ,118, $p = .0218$). Consideration of the simple effects contributing to the interaction revealed that the phase effect was the result of a significant increase (indicating an increase in security) in scores over time for the subjects in the treatment group ($F = 14.883$, df, 2,118, $p<.0001$) which was absent for subjects in both the control groups. Sleep corrected Flint scores for subjects in the normal sleep control group remained relatively stable and the change in scores for subjects in the normal sleep control group was not statistically significant.

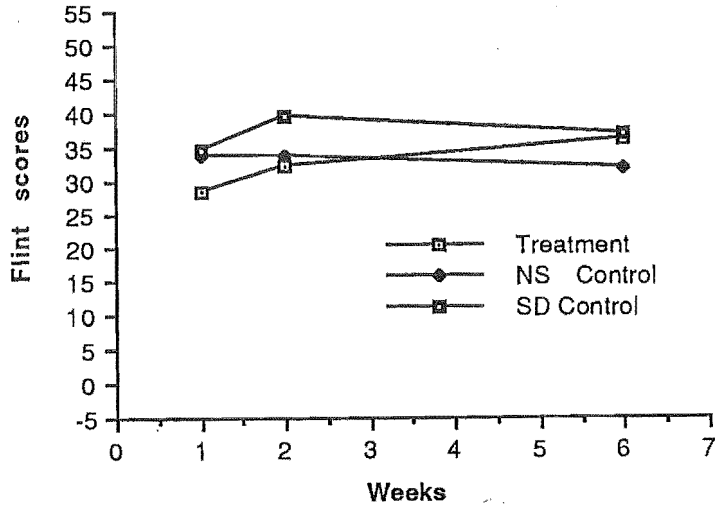


Figure 23. Mean Flint Infant Security Scale scores across groups and phases.

Clinical Significance of the Change:

Flint (1974) supplies very little information on the psychometric properties of her test. The distribution of scores in her standardization sample rises sharply at a score of 25 and is skewed in a positive direction (see Figure 24). This distribution means that relatively small score differences may represent a large percentile change, depending on the level of scores. This has occurred in the present study and accounts for the lack of statistical significance in the results of subjects in the sleep disturbed control group whose magnitude of change across phases was apparently as great as that of subjects in the treatment group. A close examination reveals that whereas the scores for the subjects in the control groups remained at around the 61st percentile throughout, the sores for subjects in the treatment group moved from just below the 31st percentile to the 61st percentile.

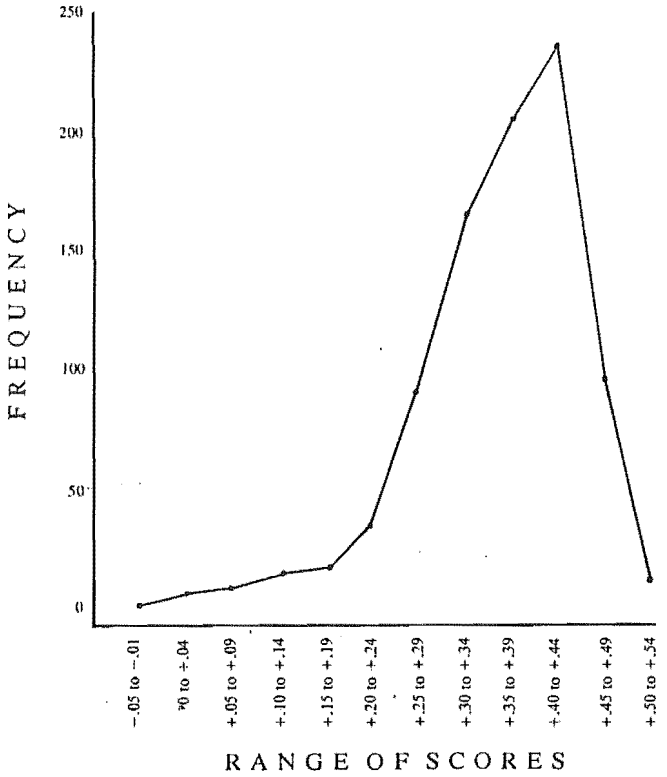


Figure 24. Distribution of 890 Security scores

(Flint, 1974. p. 12)

Only two treatment group children scored below 20 at the beginning of the maintenance phase, one of these subjects was just below the cut off with a score of 18, the other's score had increased considerably from -28 to 16.

12.5.2. Child Behaviour Characteristics Scale:

12.5.2.1. Composite Score Ia : Alertness/Attention/Curiosity:

Table 33

CSIa: Alertness/Attention/Curiosity

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	21.6	21.7	21.9	22.1
(S.D.)	(2.36)	(2.26)	(1.83)	(2.02)
N.S.. Control	22.1	20.8	21.4	21.4
(S.D.)	(2.43)	(2.51)	(2.60)	(2.22)
S.D.Control	22.4	21.6	20.8	21.2
(S.D.)	(1.74)	(2.29)	(1.99)	(2.04)

N.B. Higher score indicates more Alertness/Attention/Curiosity, maximum score is 24.

Table 33 presents mean CSIa scores across the three groups and four phases being baseline, third day of intervention, beginning of maintenance and follow-up. Figure 25 presents mean scores on CSIa of the treatment and control groups across the four phases. As Table 33. shows, mean scores on this factor differ very little either between groups or across phases. There were no significant differences in mean scores across either groups or phases for CSIa when it was considered across all four phases. Consideration of the scores for CSIa across the first three phases only, however, showed a significant phase ($F = 5.341$, df, 2,118, $p = .0060$) effect which a subsequent Tukey

comparison showed to result from differences between scores for the baseline phase compared with both the other phases ($p<.05$). There was also a significant interaction effect ($F = 3.531$, df 4,118, $p = .0093$). Closer investigation of the simple effects contributing to the interaction revealed a significant difference between phases for the subjects in both the control groups (normal sleep control group: $F = 3.642$, df, 2,118, $p=.029$; sleep disturbed control group: $F = 5.481$, df,2,118, $p = .005$) which had lower scores at the first and second intervention phases than at baseline.

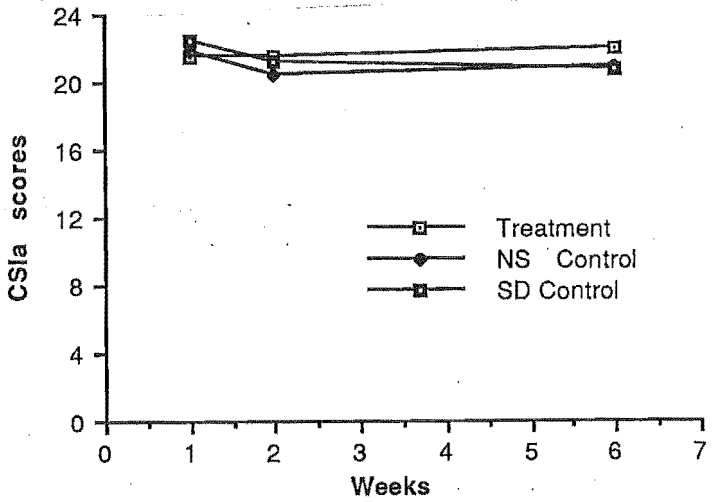


Figure 25. CSIa: Alertness/Attention/Curiosity; mean scores across groups and phases.

12.5.2.2. Composite Score II: Learning difficulty:

Table 34.

CSII:Learning Difficulty

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	6.2	6.2	6.2	5.4
(S.D.)	(2.23)	(1.67)	(2.0)	(1.91)
N.S.. Control	6.3	6.0	5.7	5.8
(S.D.)	(2.39)	(2.83)	(3.04)	(1.89)
S.D.Control	5.4	5.7	4.6	5.0
(S.D.)	(2.06)	(2.87)	(1.91)	(2.1)

N.B. Higher score indicates more Learning Difficulty, maximum score is 16.

Table 34 presents mean scores on CSII for the three groups across all four phases. Mean scores vary very little from one another but there was a modest reduction in learning difficulty which was significant (phase effect, $F = 3.081$, df 2,112, $p = .0498$) when it was considered across the first three phases only. A subsequent Tukey comparison, however, failed to show any significant differences between the phases.

12.5.2.3. Composite score V: Agreeableness:

Table 35.

CSV: Agreeableness

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	24.1	25.8	25.6	25.7
(S.D.)	(4.8)	(4.6)	(4.32)	
N.S.. Control	28.3	26.2	25.5	26.0
(S.D.)	(4.94)	(4.72)	(4.37)	(4.55)
S.D.Control	27.6	26.6	25.4	26.2
(S.D.)	(5.85)	(5.63)	5.44)	(4.51)

N.B. higher score indicates more agreeableness, maximum score is 36

Table 35 presents mean scores on CSV across the three groups and all four phases. Figure 26 presents mean scores for the three groups across the first three phases only.

Mean CSV scores for the subjects in the treatment group were lower (indicating less agreeableness) than for subjects in both control groups at baseline. This difference was only statistically significant when the results for subjects in the treatment group and the normal sleep control group were compared ($F = 6.161$, df, 1, 39, $p = .017$). Mean scores for the subjects in the treatment group increased slightly over the intervention period whereas mean scores of subjects in the control groups tended to decrease over this period. There were no significant differences in mean scores for either groups or phases

when CSV scores for subjects in the treatment group and subjects in both control groups were compared. Further consideration of the larger number of subjects over the first three phases only, however, revealed a significant interaction effect ($F = 4.250$, df 4,114, $p = .0030$). Consideration of the simple effects contributing to the interaction showed that changes in subjects of all three groups over time were significant (treatment group: $F = 4.538$, df 2,114, $p = .013$; normal sleep control group, $F = 3.778$, df 2,114, $p = .026$; sleep disturbed control group, $F = 3.475$, df 2, 114, $p = .034$) with the subjects of the treatment changing in a different direction from subjects in both the control groups.

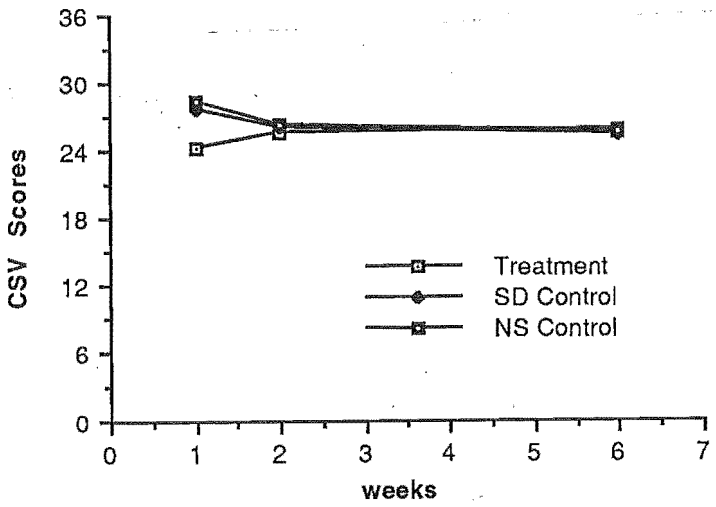


Figure 26. CSV: Agreeableness; mean scores across groups and phases.

12.5.2.4. Composite Score VII: Likeability:

Table 36

CSVII: Likeability

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	20.3	19.6	21.7	21.4
(S.D.)	(4.00)	(4.18)	(3.86)	(3.74)
N.S.. Control	22.1	22.3	20.8	20.5
(S.D.)	(3.33)	(4.42)	(3.80)	(4.44)
S.D.Control	24.3	22.5	20.4	21.8
(S.D.)	(2.25)	(3.88)	(4.30)	(3.29)

N.B. Higher score indicates more likeability, maximum score is 28.

Table 36 and Figure 27 present mean scores on CSVII for the three groups across all four phases. Subjects in the treatment group scored lower, indicating less likeability, than the subjects in both the control groups at baseline. The subjects in the normal sleep control group were slightly less likeable at this point than those in the sleep disturbed control group. Only the difference between the subjects in the treatment group and those in the sleep disturbed control group was statistically significant ($F = 9.621$, df, 1, 38, $p = .004$). Inspection of the raw data shows that the treatment group infants have a much wider range of scores on this factor (12-28) than the other two groups (N.S. controls 15-27; S.D. controls, 19-26) with 40% of the treatment group infants scoring less than 20 whereas only 26% of the infants in

the normal sleep group and 8% of the infants in the sleep disturbed group scored this low.

There were no significant main effects between groups and phases but there was a significant interaction effect(F = 3.683, df,6,147, p = .0019). Consideration of the simple effects contributing to the interaction revealed a significant increase in CSVII scores (indicating an increase in likeability) in the subjects in the treatment group (F = 3.921, df, 3,147, p = .010) with no corresponding change in the subjects in the normal sleep control group but a significant change in the subjects of the sleep disturbed control group towards less likeability over time (F = 4.310, df, 3, 147, p = .006).

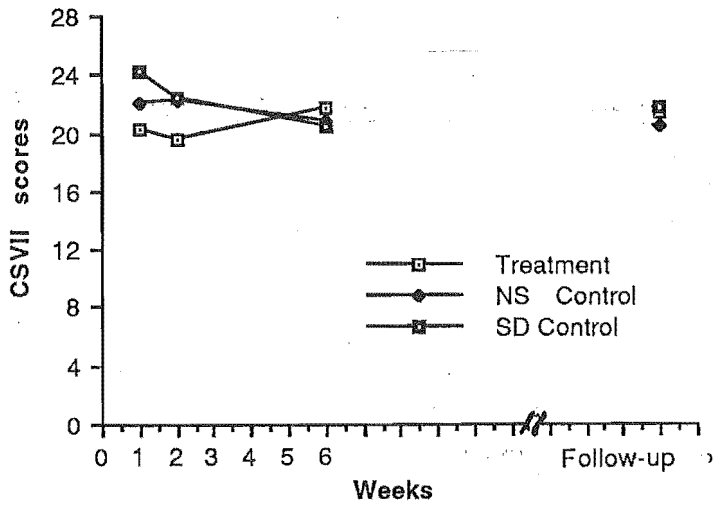


Figure 27. CSVII: Likeability; mean scores across groups and phases.

12.5.2.5. Composite Score VIII Emotionality/Tension:

Table 37

CSVIII: Emotionality/Tension

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	15.7	13.7	13.2	14.8
(S.D.)	(6.04)	(5.25)	(5.47)	(4.85)
N.S.. Control	11.0	12.3	12.7	12.7
(S.D.)	(3.54)	(4.60)	(3.84)	(4.88)
S.D.Control	9.5	11.7	12.4	12.2
(S.D.)	(5.55)	(4.96)	(6.79)	(5.33)

N.B. Higher score indicates more Emotionality/Tension, maximum score is 44.

Table 37 and Figure 28 present mean scores for CSVIII for the three groups across all four phases. Mean scores for subjects in the control groups were lower at baseline, indicating less emotionality/tension, than mean scores for the subjects in the treatment group with the mean scores for the subjects in the sleep disturbed control group being lower than the mean scores for subjects in the normal sleep control group. This difference was significant when the treatment group was compared to both the normal sleep control group ($F = 8.597$, df, 1,49, $p = .005$) and the sleep disturbed control group ($F = 7.801$. df, 1,37, $p = .008$).

Emotionality/Tension scores for the control group infants increased over time but decreased for the treatment group infants across the

first three phases. This did not lead to any significant effects on the ANOVA but consideration of the simple effects showed that the change in scores for the treatment group over time was significant ($F = 4.715$, df 2, 57, $p = .013$). A subsequent Tukey comparison showed a significant change for the treatment group between the baseline measure and both intervention phases. The slight increase in scores for subjects in the treatment group at follow-up was not statistically significant.

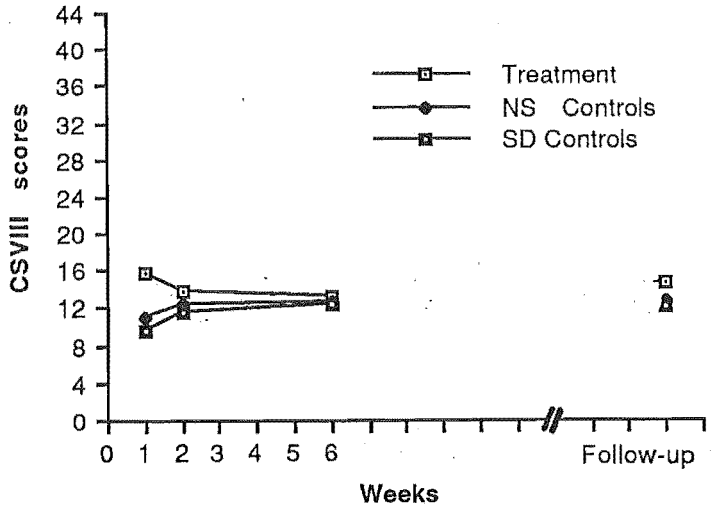


Figure 28. CSVIII: Emotionality/Tension; mean scores across groups and phases.

12.5.2.6. Composite Score Xa Withdrawal:

Table 38. CSXa: Withdrawal
mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	6.6	6.6	6.8	6.1
(S.D.)	(3.15)	(3.11)	(2.89)	(2.39)
N.S.. Control	5.2	5.4	5.5	6.0
(S.D.)	(2.24)	(3.09)	(2.39)	(2.23)
S.D.Control	5.7	5.5	5.7	6.0
(S.D.)	(1.79)	(2.46)	(1.5)	(1.5)

N.B. Higher score indicates more Withdrawal, maximum score is 16.

Table 38 presents mean scores for CSXa for the three groups across all four phases. Mean scores vary very little from one another, and there were no statistically significant between group or across phase changes.

12.5.2.7. Composite score XI Appetite:

Table 39

CSXI: Appetite

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	5.9	6.3	6.2	5.6
(S.D.)	(1.8)	(1.7)	(1.96)	(2.03)
N.S.. Control	6.5	6.1	6.5	5.3
(S.D.)	(1.4)	(1.28)	(1.32)	(1.88)
S.D.Control	6.6	6.4	5.4	5.8
(S.D.)	(1.95)	(2.10)	(1.28)	(1.46)

N.B. Higher score indicates more Appetite, maximum score is 8.

Table 39 presents mean scores for CSXI for the three groups across all four phases. Mean scores vary very little from one another, and there were no statistically significant between group or across phase changes.

12.5.2.8. Composite Score XV Activity:

Table 40.

CSXV: Activity

mean scores and standard deviations (S.D.) across groups and phases

Group	Baseline	3rd day Intervention	Beginning Maintenance	Follow-up
Treatment	7.2	6.9	7.4	6.9
(S.D.)	(1.0)	(1.04)	(.85)	(1.22)
N.S.. Control	7.4	6.9	7.8	6.6
(S.D.)	(.95)	(1.18)	(1.4)	(1.38)
S.D.Control	7.0	7.3	7.1	6.6
(S.D.)	(1.18)	(1.0)	(.94)	(1.56)

N.B. Higher score indicates more Activity, maximum score is 8.

Table 40 and Figure 29 presents mean scores on CSXV for the three groups across all four phases. There is very little difference between the scores with no significant differences between the groups at baseline. Over the intervention phase there was a trend for children in the both the treatment group and the normal sleep control group to decrease their activity scores between baseline and the first intervention phase. The activity scores increased again by the end of the intervention phase. Activity scores for infants in all groups decreased at follow-up. These differences were only significant when the treatment group results were considered over the first three phases ($F = 5.946$, df, 2,116, $p = .003$). A subsequent Tukey comparison showed that both the decrease in scores between the baseline and first intervention phases and the increase in scores between the first

intervention phase and the second intervention phases were significant ($p<.01$).

An examination of the raw data showed that whereas half of the treatment group infants decreased their Activity scores between baseline and the first intervention phase and almost half increased their scores between the first and the second intervention phases almost all the subjects made only one of these moves with only five of the 35 treatment group making both moves. Both the significant results therefore are the result of different groups of subjects at each time. There was no pattern in baseline scores which could have possibly predicted which subjects changed in which direction.

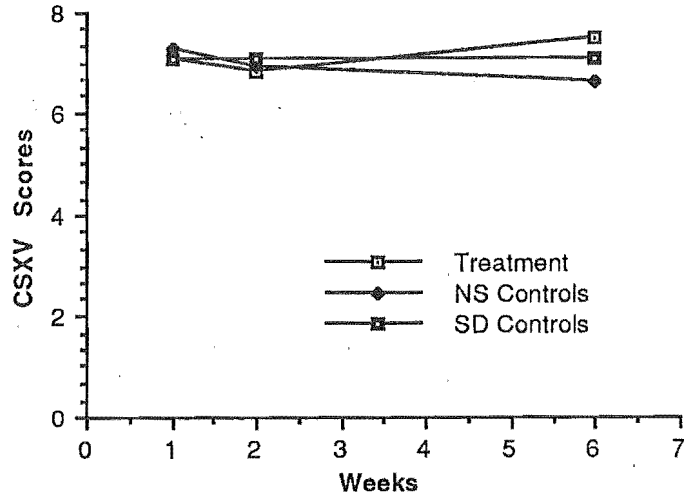


Figure 29. CSXV: Activity; mean scores across groups and phases.

12.6. DISCUSSION

From the results presented here it is possible to conclude that using an extinction-based behaviour management approach with sleep disturbed infants does not lead to any deterioration in infant security nor in a variety of the infants' behaviour characteristics. In none of the measures examined did an extinction-based intervention for the sleep disturbance lead to a change of scores in a direction indicative of negative effects.

It is also possible to conclude that the use of an extinction-based behaviour management approach with sleep disturbed infants led to improvements in infant security and several of the infants' behaviour characteristics although a more detailed examination of the data is required in order to ascertain the manner in which this has occurred.

This study compared a treatment group comprising the three groups of Study Three, whowere all treated with an extinction programme, with two control groups considered separately because of their differences on a composite scale measuring several aspects of infant sleep disturbance. The groups consisted of one group (the treatment group) whose parents' concern regarding their infants' sleep disturbance had lead to their asking for professional help, another group (the normal sleep control group) who did not present with sleep disturbance and a third group (the sleep disturbed control group) who had significantly more sleep disturbance than the normal sleep group but whose parents had not sought professional help for their infant's sleep disturbance.

It is interesting to note that, as for Chavin and Tinson (1980), the sample of children who were collected from the community contained children who had sleep disturbance but for whom professional advice had not been sought. This raises questions regarding what determines whether the parents of a particular sleep disturbed child seek help.

Comparison of the groups at baseline demonstrated no differences between the groups for the Flint Infant Security Scale, CSIa (Alertness/Attention/Curiosity), CSII (Learning Difficulty), CSV (Agreeableness), CSX (Withdrawal), CSXI (Appetite) and CSXV (Activity), although in most cases there were trends towards more negative scores on these factors for subjects in the treatment group than those in the control groups. For the other two composite scores there were differences between the groups at baseline. In the case of

(CSVII, Likeability) the infants in the sleep disturbed control group were seen as more likeable than the treatment group whereas the subjects in the normal sleep control group were not. In the case of CSVIII (Emotionality/Tension), the infants in the treatment group were seen as more emotional/tense than the infants in both the control groups. This warrants further investigation as it is unlikely, given the disparity of Emotionality/Tension between the two sleep disturbed groups, that the Emotionality/Tension of the treatment group subjects is due to their sleep disturbance. It is not possible to claim that the treatment group scored in a more negative direction on CSVIIII because their sleep disturbance influenced their behaviour or their parent's perception of them. If this were the case a similar level of Emotionality/Tension would have been present in the subjects of the sleep disturbed control group. Whether the treatment group were referred for treatment because they were emotional and tense as well as sleep disturbed or whether both referral for treatment and infant emotionality/tension result from parental variables such as anxiety has yet to be ascertained. The finding that the sleep disturbed control group are rated as more likeable than both the treatment group and the normal sleep control group raises the question whether likeability in sleep disturbed infants leads to more tolerance of and less concern regarding sleep disturbance on the part of the parents. Conversely, perhaps more tolerant and less concerned parents result in more likeable babies. It is also possible that the sleep disturbed control group parents are more likely to deny sleep disturbance and other negative behaviour characteristics in their infants.

There were significant changes, in a positive direction, for the infants in the treatment group but not for infants in either control group on a number of measures. The changes on CSXV (Activity) are open to interpretation. These should be considered in turn.

Infants in the treatment group improved significantly on the Flint Infant Security Scale over the intervention period. Although treatment group subjects did not score significantly differently from subjects in both the control groups at baseline, or at either intervention point the change is still important. Subjects in all groups scored on or below the bottom of Flint's optimum range on this test. This result is consistent with Watt's (1985) finding in another group of New Zealand infants. Scores for subjects in the treatment group, however, moved to within the optimum range over time. The skewed distribution of results on this test masks the extent of the apparently small change in scores demonstrated by the treatment group which change more markedly when they are expressed as percentiles. The fact that the data paths cross further masks the extent of the change in the treatment group in relative to the control groups. The treatment group, in both analyses, starts at a slightly lower level than both the control groups and finishes by scoring slightly higher. Although at no point do the mean scores for the groups differ significantly from each other, subjects in the groups do differ in their response over time with the treatment group subjects demonstrating a statistically and clinically significant change in scores which is not apparent in the other groups.

The scores of CSIa (Alertness/Attention/Curiosity) improved slightly for the subjects of the treatment group but not the subjects of the control groups whose scores deteriorated significantly when considered over the first three phases only. Inclusion of the follow-up phase did not reveal any further changes over time for any of the groups. The deterioration of control group subjects is difficult to interpret, but may reflect the test/retest properties of the scale or a difference in consistency between the parents of children in the control groups and the parents of children in the treatment group. The trend for the control group infants to score towards the maximum for this

scale may also result in a ceiling effect leading to a decrease in scores for the control groups subjects but not the treatment group subjects. Caution is therefore required in drawing conclusions from results on this factor. It is clear, however, that the treatment group children were not adversely affected on this measure over the intervention period or at follow-up and the trend was towards improvement on this factor despite deterioration in the control group over time. This trend is strengthened by its appearance in analyses of both control groups.

CSII (Learning Difficulty) showed some evidence of change across phases but there were no effects reliable enough to be evident on a subsequent pairwise comparison. The scores of treatment group infants remained stable, on this factor, across the intervention period so there was no evidence to suggest that there was any change in this group in response to treatment.

Scores on CSV (Agreeableness) improved, over the first three phases, for infants in the treatment group whereas the scores of infants in the control groups changed in a negative direction.

Scores on CSVII (Likeability) improved significantly for the treatment group infants over the intervention period. This trend continued between the second intervention phase and follow-up. There was no change on this score for the infants in the normal sleep control group. CSVII was the only factor on which the control groups' subjects behaved differently. Children in the sleep disturbed control group, who rated as significantly more likeable than the children in the treatment group, deteriorated significantly over the intervention period until both groups were extremely close in scores at the second intervention phase and indistinguishable at follow-up. This result is difficult to explain. Suggestions explaining the difference between the sleep disturbed control group children and children from other groups at baseline have been made above. The

sleep disturbed control group infants started as more likeable than the treatment group infants who were not significantly different from the normal sleep control group infants. The sleep disturbed group infants were rated significantly less likeable over the intervention period. There was very little further change by follow-up. It is possible that protracted untreated sleep disturbance leads to infants being rated as less likeable but this would not explain the difference between baseline and the first intervention phase. One explanation is that the decrease in scores between these first two phases is the result of a ceiling effect given that the sleep disturbed control group subjects were scored at nearly maximum scores on this factor. This, combined with a change in their parents' perception of them as their sleep disturbance continued could have combined to give the total effect apparent over the first three phases. It may also be helpful to consider the effects of asking the parents of children in the sleep disturbed control group of to rate their infant's sleep and general behaviour. The extent of their infant's sleep disturbance may have only become apparent to these parents on filling in the first SBS form at baseline. This may have led to the parents focusing on the sleep disturbance and viewing the child less favourably from the next rating point on, particularly if the parents of these children were inclined to deny problems, as suggested above. Further investigation could be carried out by asking parents to rate their infants' likeability in the absence of rating their infants' sleep behaviour which could be rated by an independent person, or retrospectively.

On CSVIII (Emotionality/Tension) children in both control groups were significantly less emotional/tense than the children in the treatment group. The treatment group infants became significantly less emotional and tense over the intervention period and although their scores had deteriorated slightly again by follow-up this change was not significant. This result was entirely consistent with the

results from the Flint Infant Security Scale which could be seen as measuring similar infant characteristics.

The only difference between the two measures was the Flint's failure to demonstrate a significant difference between the treatment group subjects and both control group subjects at baseline. This failure may be a function of the Flint scoring distribution which, as mentioned above, results in clinically significant differences between apparently close scores. The statistically non-significant differences between the treatment and the control groups at baseline do, however, represent a large change in percentile scores.

The treatment group infants changed significantly on CSXV (activity) between the phases. This result is difficult to interpret for two reasons. Firstly what constitutes a positive change on this measure is open to interpretation. Secondly, the changes in scores obtained by the infants in the treatment group were in different directions, depending on the phases, with a decrease in activity, compared to baseline, apparent on the third intervention day and an increase of activity, back to approximately baseline levels apparent at the beginning of the maintenance phase. Reference to the raw data clearly showed that the two different changes were made by two different groups of subjects, with only five of the 35 individual infants in the treatment group making both changes and only three of the individual infants in this group making no change at all. This raised the question: "Does the score of an infant at baseline predict the direction of change he or she will take?" Although there was a trend towards infants who increased their scores having lower scores at baseline and infants who decreased their scores having higher scores at baseline, the scores were very close and standard deviations indicated considerable overlap. With the information obtained in this study it is not possible to explain the result on factor CSXV. Further investigation in the future, such as an item analysis of the

questionnaire results or reference to the parents' opinion of the change noticed in each child would perhaps clarify the matter.

The changes made by the treatment group children, although in a positive direction were all very small when actual changes in raw scores and mean scores are considered. This raises the question of the importance and clinical significance of these changes. Jacobson and Revenstorf (1988) describe statistical techniques for defining clinical significance. One criterion they present is that of a change in the subject of two standard deviations beyond the mean of the dysfunctional population after intervention. Clearly, few of the treatment group subjects in Study Four would have changed to this extent. Jacobson and Revenstorf (1988), however use certain assumptions when determining clinical significance. One primary assumption is that the subjects in the treated group should be dysfunctional and that there be a functional group for normative comparison. Blanchard and Schwarz (1988) summarize this assumption in their statement "For a change to be clinically significant, there must be a clinical problem" (p.171). Baer (1988) and Saunders, Howard and Newman (1988) express similar ideas. The assumption that the treated group were dysfunctional on the behaviour characteristics (as distinct from the sleep disturbance) does not apply to the subjects considered in this study. The children were recruited from a well baby clinic and assessment interview did not reveal any problems concomitant with the sleep disturbance. There were very few differences at baseline between the treatment and the control groups. What differences there were were slight. Although the changes evident in treatment group subjects in this study were slight, they were sufficient to demonstrate that the use of extinction does not lead to negative changes in infants and that there are reliable, albeit modest, changes in a positive direction. These findings are compatible with those of Sanders et al. (1984) whose group of pre-

schoolers presented with no clear behaviour problems other than sleep disturbance.

Although no predictions were made regarding the quality or direction of change expected in this study, consideration of the Composite Scores on which no significant changes occurred is useful. There were no differences between the groups in scores obtained on Withdrawal (CSXa), and Appetite (CSXI). The result on Learning Difficulty (CSII) is equivocal but there was no change for the treatment group children and the overall result is most parsimoniously considered as showing no difference between the groups. These behaviour characteristics, with the possible exception of CSXa (Withdrawal), are characteristics which are possibly influenced more by factors intrinsic to the individual than by environmental events. The infants considered in this study are babies referred from "well baby" clinics, not infants with any demonstrable psychopathology. Infants whose learning, and appetite are affected by environmental events are likely to be classified by serious labels such as "failure to thrive" or "environmentally retarded". One would not expect such effects within the groups considered in this research. Similarly, although it might be possible that a baby distressed by a stressful intervention such as an extinction programme could evidence some temporary withdrawal from others in his environment one would usually associate such behaviour with an infant who evidenced a marked separation anxiety. Infants with failure to thrive, learning difficulties and marked separation anxiety were not included in this study. Changes in all other characteristics, with the exception of the equivocal result on CSXV (Activity), have been in a positive direction. Therefore, given that no infants presented with clearly defined difficulties in the areas of learning, appetite, or withdrawal, one would not expect these characteristics to change.

Some general points on the improvements evidenced by the treatment group subjects in this study can be made. It is clear that the sleep disturbed infants whose parents sought treatment, improved when treated with an extinction based programme, by becoming more secure, more agreeable, more likeable and less emotional and tense. These benefits are in addition to improvements in sleep behaviour. The question of whether these changes are a result of actual infant changes is worthy of further investigation by an item analysis of the questionnaires and the use of independent raters. It is possible that the changes in ratings made by the parents results from a "halo" effect whereby the parents' changes in confidence and decrease in sleep deprivation are reflected in their more positive perception of their child.

The changes in subjects of both control groups are more difficult to explain. Infants in both groups decreased their scores on CSI (Alertness/Attention/Curiosity) and on CSV (Agreeableness) significantly over time. This may reflect the natural history of these measures as the infant develops, although it is unlikely that this would satisfactorily explain the changes in the short time between baseline and the third day of intervention. It is more likely that these changes reflect ceiling effects given that the children were rated highly on these measures at baseline and the rating scale format of the questionnaires is likely to discourage parents from making consistently extreme ratings. The decrease in Likeability (CSVII) evident in the results of infants in the sleep disturbed control group has been fully explored above.

The hypotheses presented in Chapter Seven have been indirectly addressed in this discussion section. Table 41 refers formally to each hypothesis regarding whether it was supported or not.

Table 41.

Summary of hypotheses and outcome

HYPOTHESIS	OUTCOME
S4,H1 That treatment by the use of extinction would have a positive impact on the treated infants. compared to controls.	+ There was evidence of reliable, albeit modest changes in a positive direction on the Flint and on several of the CBC factors.
S4,H2: That treatment by the use of extinction would have no measurable impact on treated infants compared to controls	- There were reliable, if modest change in the treatment group infants' scores c the Flint and on a large number of the CBC factors. These changes wer not apparent for the control groups or were in the opposite direction
S4,H3: That treatment by the use of extinction would have a negative impact on the treated infants compared to controls.	- There was no evidence suggestive of extinction having a negative impact on the infants

N.B. ++ denotes support for the hypothesis, + denotes qualified support and - denotes that the hypothesis was not supported.

CHAPTER THIRTEEN

DISCUSSION

This series of studies addressed a number of questions previously unanswered in the infant sleep disturbance literature. A model of the development and maintenance of infant sleep disturbance was presented. Part of this model was subsequently tested by systematically withdrawing parental attention, using an extinction programme for awakening, as described in Study One. Subsequently, extinction and trimeprazine were evaluated as management techniques. Some specific problems with their use were highlighted. The possible utility of their combination was studied to answer if such a regime would overcome some of the difficulties inherent in the use of extinction alone.

In Study Four, some of the criticisms leveled at the use of extinction on ethical grounds were considered. By considering a variety of infant behaviour characteristics, the study sought to discover whether the use of extinction with infants led to any detrimental or positive effects.

Study One established that the use of a behavioural approach based on extinction was effective in managing infant sleep disturbance and led to durable improvements in the infants' sleep behaviour. This study was initiated at a time when there were very few reported investigations of behavioural approaches with infant sleep disturbance. Although studies were published after Study One began, Study One still contributes to the literature through its use of one technique rather than a variety of techniques, the use of a systematic multiple baseline design, its inclusion of reliability assessment and by confining its consideration to the more uniform developmental stage of infancy rather than including infants and pre-schoolers together.

Study Two evaluated two administrative regimes for trimeprazine, a sedative widely prescribed for sleep disturbed infants in New Zealand. Trimeprazine increased the number of nights the infants slept through, however its effect was highly variable and in many cases not clinically significant. There was no evidence that use of the medication at either dose led to a lasting decrease in sleep disturbance. The design of this study unfortunately did not allow for direct comparison of the two different regimes but there was little evidence that the higher dose over a shorter period was clearly more effective than the lower dose over a longer period. As in the case of Study One, this research was initiated at a time when there was no published literature on the use of sedative medication with this age group. Two studies have since been published and the results of Study Two are highly consistent with the results of both these studies. All studies conclude that the appropriate use of trimeprazine is for short-term parental relief only. Study Two contributes further to the literature by its use of a multiple baseline design which allows consideration of individual responses, its examination of a lower dose rate than either of the other two studies, its inclusion of reliability assessment and by confining its investigation to infants only rather than including pre-schoolers.

Study Three compared extinction alone as a treatment with extinction plus trimeprazine. A separate group received extinction plus placebo. It aimed to establish whether the use of trimeprazine would lead to less infant distress, more infant security and less parental anxiety during treatment. These factors had been identified as possible difficulties with the use of extinction, although no previous research had considered whether infant security and parental anxiety were in fact affected by the use of an extinction programme. The use of trimeprazine in conjunction with extinction led to less infant awakening and crying but this trend was only

significant when the medication group was compared with the placebo group. As such the clinical significance of the difference must be questioned. There was no evidence, however, that the use of trimeprazine in conjunction with extinction led to a delay in infant response to extinction evident once the medication had reached sub-therapeutic levels. There was therefore a net gain in favour of the medication group because there was no evidence that infant security or parental anxiety was worse in any group. One clear finding was that both infant insecurity and maternal state anxiety decreased over the intervention period. These gains were maintained at follow-up. It is possible that the decrease in maternal anxiety resulted from a contrast with baseline levels which could have been inflated by anticipation of the programme. Paternal state anxiety remained static throughout the data gathering period. This finding begins to answer the questions posed by Study Four. Although there was a net gain for the medication group compared with the other groups, some parents did not like the effects the medication had on their child and, with hindsight stated they would have preferred to carry out the extinction procedure without the medication.

There is little doubt that parents are concerned about the use of extinction with their infants. Scheduled awakening is the only approach to completely overcome these concerns but it is time consuming and stressful to parents who have to awaken themselves and suitable only for the minority of infants whose night wakening is in the absence of sleep onset delay. The main advantage of the the use of trimeprazine in conjunction with extinction is to offer, along with graduated extinction, an alternative to parents who are concerned about the use of an unmodified extinction procedure with their sleep-disturbed children.

Study Four compared infants treated with an extinction programme with two control groups. One control group consisted of

children who were not sleep disturbed, the other consisted of children who were, but whose parents had not sought treatment. The groups were compared on a variety of infant behaviour characteristics as well as infant security. The study aimed to establish whether extinction was detrimental to infants, or conversely, whether it leads to beneficial changes in the infants' behaviour. The ultimate aim was to address the ethical questions raised by some authors who criticize the use of extinction because of its possible detrimental effects. There was no evidence, on any of the measures,that there were detrimental effects for the infants who were treated with extinction. There was no change on the measures of learning difficulty, appetite, and withdrawal. This was considered consistent with the non-clinical nature of the groups. There was evidence, on a variety of measures, specifically infant security, agreeableness, likeability, and emotionality/tension that there were statistically significant beneficial changes in the average levels of the treated infants' behaviour. A question can be raised regarding the clinical significance of the changes on these measures. The infants who were treated however, did not present as dysfunctional on these measures, so the concept of "clinically significant" change is difficult to apply. The conclusion that there were positive changes is strengthened by the fact that the changes were reliable, if modest, and in many cases in the opposite direction from the scores of infants in the control groups. The aim of this study was fulfilled in that it was clearly established that the use of an extinction programme did not lead to detrimental effects on the measures considered.

There were methodological problems at various points of this research. In Study One and Study Two the assignment of subjects to baseline length was in effect random but the use of an explicitly random technique would have been technically more correct. It was

not possible to gather reliability information over the baseline and intervention period in Study One or for all the Children in Studies Three and Four. To have done so would have been desirable. The use of telephone reliabilities in Study One merely checked consistency between parents' verbal reports and written accounts. It guarded against the possibility that parents may fabricate records prior to collection but did not provide a measure as to the veracity of parental reports. There were other problems with the reliability measurement particularly with calibration of the instrument which risked either false positives or false negatives. It was not possible to ascertain whether noise registered on the event recorder originated, in fact, from the infant or from extraneous sources. The slight noise made by the machine during operation was distressing to some children. The addition of a pressure pad, developed for Lawton (1985) overcame some of these problems and was used for the final follow-up in Study One. The best alternative, however, the use of the all night video equipment described by Anders (1979), was unfortunately not possible for this research.

Parental behaviour was the most important determinant of the extinction programme outcome but its measurement was secondary to that of the infants' behaviour. Direct measurement of parental behaviour would have been beneficial. this would have provided a measure of the integrity of the independent variable (Peterson, Homer & Wonderlich, 1982).

Study Two would have been strengthened if the drug regimes had been assigned randomly and dose rate and length of administration controlled for separately. Abrupt withdrawal of the medication during the washout periods would have given a better measure of drug-withdrawal insomnia.

The difficulties in recruiting the treatment groups at the same time in Studies Three and Four and the discrepancies in follow-up times

was unfortunate but outside of the experimenter's control. Addition of consumer evaluation in Study Three could have clarified whether the medication usage in fact was preferable to parents. The only evidence collected on this question was anecdotal. Parents' global ratings of their infant's response to the extinction programme would have provided a measure of the extent of the beneficial changes. The addition of an external observer would have separated parents perceptions of their children from actual changes in behaviour.

Suggestions for future research, firstly, stem from the methodological problems of this research. Overcoming the methodological problems presented by quasi-random assignment and problems with the reliability measures is unlikely to lead to important changes in the findings of such research, but closer investigation of parental behaviour is important. In this research, parental behaviour was measured by self-report only. It is possible that parents under-reported non-compliance. The use of all night video recording could establish the true extent of parental non compliance and its effects on the infant's response. One recurring theme in the infant sleep disturbance research and this present research is that extinction is difficult for parents and alternatives are desirable. If it was established that the infants' response to extinction is robust enough to withstand some parental non-compliance this could lead to the development of further modifications of the basic extinction approach, for example, one which involves minimal checking. Rolider and Van Houten's (1984) finding that gradual increase in time spent by parents in ignoring sleep onset delay does not lead to shaping longer and more resistant crying does point towards the possibility that extinction programmes may be modified and made less intense.

Further investigation of trimeprazine dose rates is important given that the stronger dose did not lead to clearly greater effect. Given the

amount of trimeprazine and other sedatives prescribed world-wide and the lack of knowledge regarding their effects, prescription at the minimum dose rate would be desirable. Further investigation of this drug's side effects, particularly effects on infant behaviour during the day, is important as many parents voiced disquiet after noticing changes in their infants.

Direct measurement of parents' experiences using the various management regimes described here and in the literature is important. Consumer satisfaction questionnaires would clarify which approaches were acceptable to parents, the advantages and disadvantages of each. This information would be of immeasurable use to parents who could use it to make their own decisions regarding the management of their child.

Further investigation of the positive changes found in the treated infants in Study Three is needed. Firstly, given that the changes, although reliable, were modest it is important to explore the nature of these changes further. An item analysis is could clarify whether the modest changes were the result of all the treated infants changing consistently on a few items or changing slightly overall. Alternatively, the modest overall changes may have been the result of a few children changing more markedly. Secondly, direct observation of the infants' behaviour, by an independent rater, could help to ascertain whether the improvement in infant behaviour characteristics perceived by the parents was in fact based on actual changes in infants' behaviour. It is possible that the parents' ratings may have been influenced by their expectations or that they may have perceived their infants more positively once they, themselves, were no longer sleep deprived. If there are actual positive changes in infant behaviour this information would establish a future direction in infant research by leading to the investigation of various parenting styles and their effects on children, helping parents to choose their approach to managing their child in

general. It is possible that effectively changing a distressing aspect of their child's behaviour leads to increases in parental self-efficacy and greater skill in child management overall. This warrants further research.

Other directions for future research arise from the broader context of the present series of studies. Many questions arose in the Literature Review which were beyond the scope of the present research.

Consideration of factors associated with infant sleep disturbance has been amorphous and contradictory in its findings. There is a need for prospective studies considering the relationship between infant and parental characteristics and the later development of infant sleep disturbance. There are indications from Study Four that sleep disturbed children who are referred for treatment are different on certain behavioural characteristics from sleep disturbed children who are not referred, as well as being different from non-sleep disturbed children. Previous research has failed to differentiate between sleep disturbed children whose parents seek help from those whose parents do not. There may be important determinants of whether a child is referred or not. These determinants may be inherent in the child, such as temperamental or personality factors, they may be inherent in the parent, such as anxiety levels or access to social supports or they may be inherent in the parents parenting philosophy, such as whether medication use is acceptable or whether infant sleep disturbance is viewed as a problem. Closer consideration of these issues could lead to greater options for concerned parents if non-concerned parents have found ways of handling or construing the phenomena of infant sleep disturbance that reduces its impact as a problem. It could also lead to a greater understanding of infant sleep disturbance and its interaction with other infant and parental variables.

The existing research on infant sleep disturbance has shown that infant sleep disturbance can be modified. A logical next step would be an investigation where parents are trained to apply behavioural principles in order to prevent the development of infant sleep disturbance in the first place.

One new future direction which has not been considered by the research at all is the question of the interface between developmental and behavioural aspects of infant sleep disturbance. The model developed in this thesis ties together the work done by authors familiar with the physiological and neurological aspects of infant sleep with those who are familiar with the behavioural aspects of infant sleep disturbance. Sleep disturbance is seen as a function of immature sleep development characterized by frequent REM arousals. This research and other research in the infant sleep disturbance literature has established that the vocalisations resulting from these arousals can be modified. There is, however no evidence as to whether a behavioural programme which successfully decreases audible night-time awakenings actually decreases awakenings in response to REM arousals, or the REM arousals themselves. Conversely, there has been no consideration of whether reinforcing audible night wakings affects the number or nature of REM arousals and specifically whether this reinforcement results in an increased likelihood of the infant awakening during REM bursts. This would be a fruitful area of research and could lead to a consideration of the role that environmental events have in the development of phenomena which are usually considered to be purely physiological only.

This research has begun to answer some important questions in the area of the management of infant sleep disturbance. These questions

were not only of academic relevance but were of extreme importance to the parents of sleep disturbed infants and the infants themselves. This research has answered some questions but, as is usual in the field of human behaviour, as many questions have been raised as have been answered. As such, this final chapter can be seen as a beginning as well as an end. The full value of this investigation will be realized if it leads to further research, as well as more confident decision making on the part of parents of sleep disturbed infants and the clinicians who work with them.

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Appendix A.

Structured Interview.

Fading ☐

Extinction ☐

Drug ☐

SLEEP PROGRAMME

Structured Interview Format

EXT/REINF. ☐

DR'S Info. ☐

Consent Form ☐

Family Surname: Date of Initial Interview:

Address: Telephone:

Date of referral: Family doctor consulted Yes/No

Referral from:

Household Composition

Adults Name Age Race Occupation

Children

Significant others - re child minding

Child having Sleep problem date of birth

Actual Bedtime Ideal Bedtime

" Settling time " Settling time

" Getting up time " Getting up time

Average night wakings over whole of sleep time

Daytime Sleep? Yes/No. Actual times _____ to _____

_____ to _____

Ideal times _____ to _____

_____ to _____

Describe Nature of Sleeping Problem

Age at Onset Continuous/Intermittent

Clear Precipitating Event Yes/No

Describe

Describe Child's development thus far:

Pregnancy

Birth

Feeding

Activity

Crying

Sleeping pre 3 months

Medical history

Birth Order 1, 2, 3 or subsequent

Sleeps Alone / Not alone

Describe

Family Life Events over Child's Life

Other problems Child: present/absent

Family: present/absent

Describe

What is done now to handle the child's problem?

What has been done in the past?

Advice received from:

Dr Plunket Mother/in law Friends Other

Describe

Is Medication used now Yes/No

Describe

Has Medication been used in the past Yes/No

Describe

Appendix B.

Daily Sleep Diary and information sheet

SLEEP PROGRAMME

DATA SHEETS: INFORMATION

1. Record 1 day down each column.

2. Day Sleep record the time the child is placed down, the time he or she wakes for each of 1 or 2 sleeps. Also record if the child sleeps away from home or in the car.

3. Record the number of crys or grizzles the child emits between the hours of 5 - 7. If the child stops briefly and starts again, count as 2.

4. Night Sleep
   (a) Record if at home or out. State actual bed-time and the ideal bed-time for that night, explain if ideal time is later than goal time.
   (b) Record the time the child takes from being placed in bed, to silence and describe the quality of the noise. i.e. chatting, singing, crying. Indicate code letters under "key"
   (c) Record number of times awake, the duration and what you did for each. Indicate code words under "key".

5. Record the time the child wakes in the morning.

Child's Name: _____ Week: ____ Condition: _____

Goal Bed-time _____

	Date						
Day sleep - time down							
time awake							
where							
Night sleep - where							
Actual bed-time							
Ideal bed-time							
Explain if necessary							
Time from in bed to silence							
Describe noise							
No. of times awake							
Approx. duration	1.						
What did you do							
	2.						
	3.						
KEY =							
	4.						
	5.						
	6.						
	7.						
Time Awake In Morning							

Appendix C.
Method of computing scores on the Sleep Behaviour Scale (From Richman,1985)

Method of computing scores on the Sleep Behaviour Scale (From Richman,1985)

Av. time taken to sleep (min)	Score or	Av. Bedtime (whichever is worse)
<15	0	5-8.4p.m.
16-29	1	8.5-9.2p.m.
30-44	2	9.3-10p.m.
45-60	3	10.1-11p.m.
>60	4	after 11.0p.m.

Av. total time slept at night in hours		Av. No. of nights waking per week
12+	0	None
11+	1	1-2
10+	2	3-4
9+	3	5-6
<9	4	7

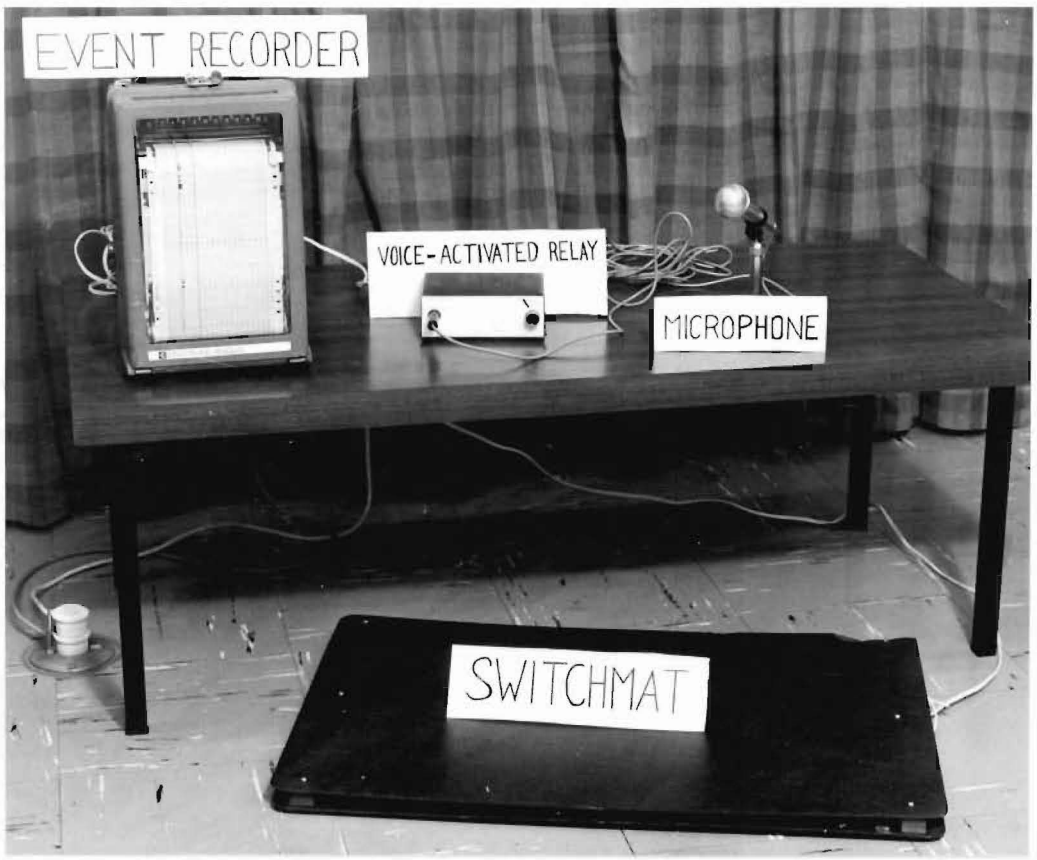
Av. No. of wakings per night		Av. time awake per waking (min)
<.03	0	0-5
0.4-1.0	1	6-15
1.1-2.0	2	16-30
2.1-3.0	3	31-60
3.0	4	>60

Av. weekly hours in parents' bed (No. nights x Av. No. hours)	
None	0
1-6	1
7-20	2
21-34	3
35+	4

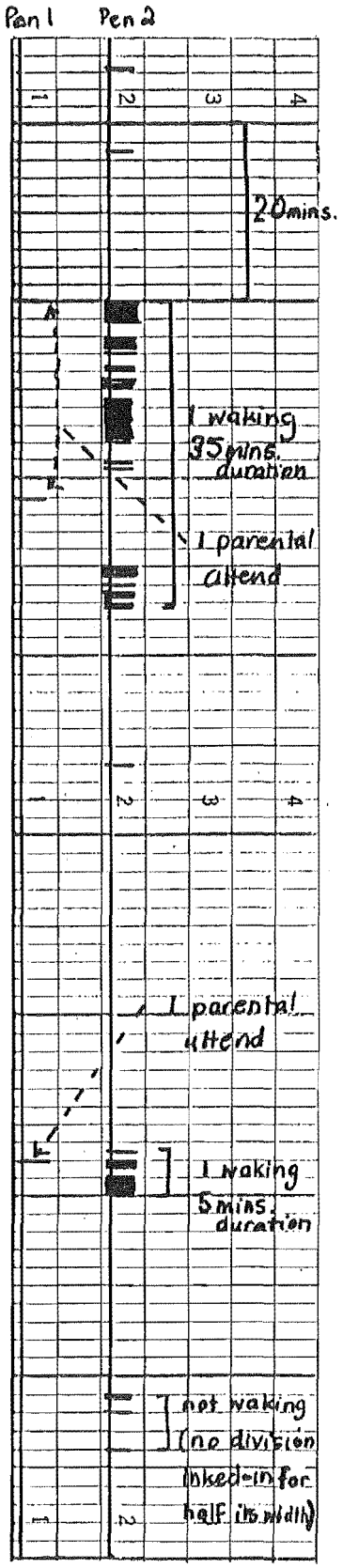
Appendix D.

Reliability : equipment and criteria for transcribing the event record to numerical values (from Lawton, 1985).

Photograph of reliability apparatus



CRITERIA FOR TRANSCRIBING THE EVENT RECORD TO NUMERICAL VALUES



(1) Calculate the time by measuring the distance on the event record from the time the parents started the recorder. Each division on the chart paper (Esterline Angus Type 1710X) represents two minutes, since the paper travelled at 7.6cm per hour.

(2) Score a <u>waking</u> if there is a mark on the channel connected to the voice-activated relay (Pen 2), so long as that mark is inked-in for at least half a division.

(3) Do not score another waking until there are at least seven-and-a-half divisions that are blank between wakings. In other words, there must be fifteen minutes of silence before further crying constitutes a 'new' waking rather than the same one.

(4) Measure the duration of waking by counting the divisions inked-in or those marked by numerous pen excursions.

(5) Score a parental attend each time there is a mark on the output from the channel connected to the switchmat (Pen 1), unless there are two parental attends that occur during the same waking. Score these as a single attend. This situation may arise when parents pick up their child and then replace it during one waking.

Appendix E.

Parents information and contract sheet, Study Two.

University of Canterbury Christchurch 1 New Zeal

15 March 1982

Dear Parent/s,

Thank you for taking part in our research project. Infant sleep disturbance is very common and of some concern to many parents, however there is very little research regarding ways of managing it. The sleep research currently being undertaken within the Psychology Department aims to develop new ways and refine existing methods of managing infant sleep disturbance. The ultimate aim is to inform those responsible for advising parents such as doctors, plunket nurses and psychologists about our findings.

The part of the study you have been asked to join aims to evaluate Vallergan (trimeprazine tartrate), a mild sedative widely prescribed for children's sleep disturbance. It is possible that this drug may work by breaking the child's disturbed sleep pattern but little is known about the effectiveness of different dose rates, or its effectiveness over time. We will be investigating two standard dose levels and evaluating its effects over several weeks.

Your part in the study is as follows:

1. By this stage you will have given your permission for Dr Wilkinson to telephone your family doctor in order to explain the programme to him or her.

2. You will be supplied with 4 bottles, one at a time. One or two of these bottles may contain a sugar syrup, called a placebo, which will not conta the active drug (trimeprazine tartrate).

3. Neither the principal investigator (Karyn France), her research assistant (Kevin Moesbergen) nor yourselves will know which nights your child receives the sugar syrup and which nights, the active drug. This is a "double-blind" research design and is necessary for meaningful results to be obtained from the study. For safety, however, another member of the department (Dr Nirbhay Singh) and the General Practitioner involved in the research (Dr Peter Wilkinson) do know and should be contacted if at any stage you are in doubt regarding your child's response to the medication.

4. During the period of medication, your child may respond favourably to the extent that you will no longer be concerned about his/her sleeping pattern. However, should your child continue to have disturbed sleep by the end of the course of medication you will be offered other management advice.

To ensure maximum safety, and good research practise, we require you to read the following statements and sign in the space below.

... (Continued)

(a) I/we have read and understand the description of the research project above.

(b) I/we agree to give _____ the prescribed medication everynight throughout the study according to the specific directions below. Any deviation from this will occur only after discussion with Dr Singh and/or Dr Wilkinson.

(c) I/we agree to continue filling in the record sheets throughout the study.

(d) Should I/we at any time be concerned about my/our child's response to the medication I/we agree to contact Dr Singh (482-009 Ext 8577, Residence 489-415) or Dr Wilkinson (Surgery 496-716 Residence 489-082) immediately and to discontinue medication until the matter has been discussed with one or both of them, as necessary.

(e) I/we understand that should _____ not respond favourably to the medication we will be offered other advice on managing his/her sleep disturbance.

Parent/s signatures:

_____ _____

Thank you again for taking part; please do not hesitate to make contact if you have any queries.

Karyn G. France,
DEPARTMENT OF PSYCHOLOGY.

CONTACT NUMBERS:

Kevin Moesbergen	482-009	Ext	8678		
Karyn France	482-009	Ext	8681	Residence	496-906
Nirbhay Singh	482-009	Ext	8577	Residence	489-415
Peter Wilkinson	496-716	Surgery		Residence	489-092

Appendix F.
Correspondence with the Royal College of General Practitioners.

University of Canterbury Christchurch 1 New Zealand
Department of Psychology

16 November 1982

Dr I.H.W. Squires,
Royal College of General Practitioners,
c/- Woodham Road Surgery,
160 Woodham Road,
Linwood,
CHRISTCHURCH.

Dear Dr Squires,

I am writing to confirm the points covered in our telephone conversation of 10 November.

Subjects age 6 months to 2 years will be taken into studies 3 and 4 of the infant sleep disturbance project shortly. Kevin Moesbergen, my research assistant is also running a project in his own right offering behaviour management advice to parents of sleep disturbed preschoolers 2-5 years of age.

Subjects may be assigned to one of three possible conditions:

1. Families who wish no further involvement in the study or who are on a waiting list (should pressure of referrals require one) will be asked to record their child's sleep pattern over time, if willing.

2. Children in the 2-5 years of age group or infants whose parents do not wish to use medication will be given a behaviour management programme only.

3. Infants 6-24 months whose parents are willing will be invited to use Vallergan Forte 30mg/10mls fading over the first 10 days of a behaviour management programme.

Procedural details, as discussed, will be as follows:

Referrals : Plunket has access to virtually all children of this age group and are therefore seen as the most appropriate referral source, however, referrals from general practitioners are also welcome.

Assessment : All referrals will be assessed by myself or Kevin Moesbergen for suitability and if willing to continue will be assigned to an intervention group.

Information to General Practitioner : Once the subject has been assigned to an intervention condition his or her general practitioner will be notified in the following way:

(a) If given a behaviour management programme a letter informing the doctor of the child's inclusion and the nature of the approach will be sent, provided the child's parent/s agree.

(b) In the case of the children who will be prescribed medication a letter (see enclosed example) will be taken by the parents to the general practitioner for signing. Those parents who are not willing to approach their general practitioners will be offered an alternative management strategy.

Prescription of Medication: Once a signed copy of the consent has been returned we shall arrange for Dr Wilkinson to meet each child and his or her parent/s at the University in order for the medication to be prescribed.

Your suggestion that each individual doctor sign the prescription forms is unworkable for two reasons : Firstly, I appreciate the support and interest that Dr Wilkinson has given the project and wish him to continue in an active role. Secondly, it is important for studies 3 and 4 that precise instructions regarding the behaviour management programme be given. It is essential that all subjects receive identical information. We therefore wish to limit the number of people the subjects approach for information regarding the rationale of the intervention strategy.

I look forward to hearing as soon as possible, regarding the College's support for the project and your liaison with Plunket, and would appreciate information regarding the project being inserted in the next issue of your bulletin. A copy of this would be appreciated.

Referrals to the projects should phone 482-008 extension 8678 or 8682, however, should you have any queries about the research please feel free to contact me, phone 496-906 directly.

Kind regards.

Yours sincerely,

K. G. France.

Karyn G. France, M.A., Dip.Clin.Psych., MNZPsS.
Lecturer in Psychology

The Royal New Zealand College of General Practitioners

INTERIM ETHICAL COMMITTEE OF CANTERBURY FACULTY

C/- Preventive and Community Medicine
Christchurch Clinical School of Medicine
Christchurch Hospital
CHRISTCHURCH

9 December 1982

Ms Karyn G. France
Department of Psychology
University of Canterbury
CHRISTCHURCH

Dear Ms France

Re Your Research Programme on Sleep Disturbance in Children

Your letter of 16 November to Dr Ian Squires has been referred to me as Chairman of the Interim Ethical Committee of the Canterbury Faculty of our College.

Because we are just inaugurating our Ethical Committee, we are at the moment working in close co-operation with the Ethical Committee of the North Canterbury Hospital Board. We have asked this latter Ethical Committee to review your project and we have discussed it with them. As a result of these meetings and discussions, there are some points we would like to make.

In the matter of Referrals: The consensus of opinion was that referrals should only be accepted from general practitioners who have the necessary background knowledge of the physical and psychosocial health of each family referred. It would seem important that the pattern of referral is from the plunket nurse to the general practitioner and on to the research programme.

As regards the Double Blind Administration of Drugs, there are several matters which require elucidation. Firstly, participating patients (in this case the parents of the children) must understand the circumstances and the fact that they may be receiving a placebo drug. Secondly, the parents must sign an informed consent form. Finally, the code of the Double Blind Drug status of each patient must be available to all professional participants in the programme (including general practitioners) 24 hours-a-day and seven days a week. Could we suggest the use of sealed envelopes containing the code of all medications prescribed.

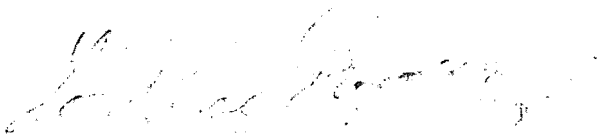
Concerning the drug regime of Vallergan: Firstly, we have some reservations about the dosage of Vallergan you suggest. It seems very high even by anaesthetic administration standards. Secondly, the dosage must be available at all times to all professionals involved in the study independent of the double blind status.

General Practitioner Approval Consent Forms: These seem superfluous if the referral is to be made by the plunket nurse via the general practitioner and this General Practitioner Approval form will no longer be necessary.

In regard to the above reservations, you will realise that intercurrent infections and other more serious problems up to and including cot deaths may occur at any time. It is essential that all the professionals concerned with the children in your study have all the programme information available and also have mutual respect. We think that the above recommendations would ensure this.

I hope that you will not regard our recommendations as too destructive. We consider them to be the minimum in your most interesting study. We agree that the subject of infant sleep disturbance is poorly researched and we look forward to seeing your results. In this regard, it would be a wonderful gesture for you to send copies of your final paper to all the general practitioners who have co-operated in your study.

Yours sincerely



Lanktree Davies
Chairman, Interim Ethical Committee

23 December 1982

Dr L. Davies,
R.N.Z. College of General Practitioners,
c/- Preventive and Counselling Medicine,
Christchurch Clinical School of Medicine,
Christchurch Hospital,
CHRISTCHURCH.

Dear Dr Davies,

Karyn France has passed onto me the letter which you sent to her on 9 December 1982. Whilst she will be replying to most of the points you make, I would like to seek clarification on one matter since it has some rather far-reaching implications. You state that " ...referrals should only be accepted from general practitioners who have the necessary background knowledge of the physical and psychosocial health of each family referred." I am puzzled by this and would be most grateful if you were able to provide me with a little more explanation.

As I interpret it, it could either mean that 1) some but not all g.p.'s have this knowledge, or 2) all g.p.'s have this knowledge and must be the only referring agencies. This ambiguity apart, I am surprised by the concensus of opinion of your committee. In the matter of psycho-social health for example, I should have thought that clinical psychologists were ideally qualified to make assessments.

I am sorry to burden you with this matter but look forward to your reply with interest.

Yours sincerely,

K.T. Strongman, Ph.D.
Professor of Psychology
and Head of Department.

The Royal New Zealand College of General Practitioners

INTERIM ETHICAL COMMITTEE OF CANTERBURY FACULTY

C/- Department of Community Health
Christchurch Clinical School of Medicine
Christchurch Hospital
CHRISTCHURCH

25 January 1983

Professor K.T. Strongman
Department of Psychology
University of Canterbury
CHRISTCHURCH

Dear Professor Strongman

Thank you for your letter of 23 December 1982. It arrived shortly after my departure on holiday so I regret the delay in replying to you.

Thank you for pointing out the ambiguity in the matter of referrals in my letter. I certainly hope that general practitioners have a greater awareness and background knowledge of the physical and psychosocial aspects of the health of their patients as compared to plunket nurses. Though I am sure we could debate this at great length, the accuracy or not of my statement is not of great importance in the matter of the ethics of research.

The point I wish to make is that the interests of the patients and their families are best looked after and preserved when the referral is via the general practitioner. I will concede that this is from time to time the procedure not often followed today, but our Committee wish to reiterate that this is the best method of referral.

In no way did I wish to imply that clinical psychologists were not ideally qualified to make assessments of psychosocial health. It seems that this is the implication that you and Ms France may have taken from my letter. If that is so, I can understand the rather angry tone of your letter, but I can assure you that this is not so.

I offered the few comments I did about the research project under discussion in an effort to be helpful and co-operative. I believe that this research project is of great interest to general practitioners and I certainly do not wish to jeopardise the project at all.

It may be that the best way to resolve this if there are any doubts remaining with you and Ms France, that we should meet and discuss the matter. I would certainly look forward to the opportunity of meeting you and discussing this with you.

Yours sincerely

Lanktree Davies
Chairman, Interim Ethical Committee

c.c. Ms K. France

The Royal New Zealand College of General Practitioners

CANTERBURY FACULTY

INTERIM ETHICAL COMMITTEE

C/- Dept Community Health
Christchurch Clinical School
P O Box 4345
CHRISTCHURCH

17 June 1983

Ms Karyn France
Department of Psychology
University of Canterbury
CHRISTCHURCH

Dear Ms France

Thank you for the opportunity to rediscuss with you your project on sleep disturbance in children.

I have discussed this further with the members of our Interim Ethical Committee. We all agree to the ethical provisions of your study as outlined in your letter of 16 November 1982, but would wish to clarify the following points:

1. That for all patients referred to the study by the plunket nurse, the plunket nurse should notify the general practitioner.
2. That for all patients (except those referred by Plunket), you will notify the general practitioners.
3. That for all patients receiving medication, you will send the patient to their general practitioner with a consent form.
4. That you will offer to have available from more than one source, 24 hours-a-day, the code of the double blind medication for use in emergencies.

I wish you well in your study and look forward to hearing the results.

Yours sincerely

Lanktree Davies

Lanktree Davies
Chairman, Interim Ethical Committee

Agreed.
14.6.83.
K.G. France.

17 June 1983

Dr Lanktree Davies,
Chairman, Interim Ethical Committee,
Canterbury Faculty,
Royal New Zealand College of General Practitioners,
c/- Department of Community Health,
Christchurch Clinical School,
P.O. Box 4345,
CHRISTCHURCH.

Dear Dr Davies,

Regarding your letter of 17 June 1983. All the points you raise are acceptable to me and will be incorporated into the procedure.

Would it be possible for some information regarding the study to be included in the College Bulletin? If so, I would appreciate an opportunity to discuss it to ensure that the information given re contact telephone numbers and the like are current.

Thank you for your interest and co-operation.

Yours sincerely,

Karyn G. France
Clinical Psychologist

Appendix G.

Sample of media publicity of the Canterbury Sleep Project

(from Lawton, 1985)

Letters to the Editor, Christchurch Press.

(1) & (2). May 25, 1984.

Getting children to sleep

Sir, — What a curious attitude our society has towards sleep. ("Hush now, baby," "The Press," May 21). Parents whose child has very fair skin do not expose her to large amounts of sunshine to toughen her up. They provide a sun hat or sunscreen cream. Parents whose child is allergic to a particular food do not force him to eat it to train him out of the allergy. They take care to keep it out of his diet. Parents whose child is exceptionally tall do not cram her into too-small clothes to get her out of the habit of growing. Yet parents whose child wakes frequently at night are advised to ignore him, to train him out of the habit. Children are expected to conform to a pattern that suits some but not others, and the parents who try to meet their individual child's individual needs are deemed to be making excessive sacrifices. Why? — Yours, etc.,

CATHERINE GLUE.
May 22, 1984.

Sir, — Perish the thought that I might be an "adherent of baby-biased groups ..." ("The Press," May 21). It took me years of mothering, four children and countless remedies later, in vain attempt to solve the sleep problem. It was simple in the end. Finally, I was able to accept emotionally my child's dependency and feel her need for nocturnal contact. Welcoming her and her older sister, also a night-waker and anxious, into my bed, worked. We all slept. Six months later, the five-year-old decided independently to return to her bed, and sleeps all night. The three-year-old now sleeps all night, mostly in my bed. Occasionally she chooses to sleep (all night) in her own bed. Baby-biased groups promote long term, the interests of the child towards independence. — Yours, etc.,

CHRISTINE D. ROWLANDS.
May 21, 1984.

(3). May 29, 1984.

Sir,—Catherine Glue's assertion that ignoring children's crying in the night is analagous to feeding a child who has an allergy with the food she is allergic to is patent nonsense. I am a parent myself, and have used this technique on both my children successfully. I love my children just as much as anyone else but I do not cope well with broken sleep night after night. As for having them in bed with me, neither my husband nor myself can sleep with a child wriggling and kicking between us. I suppose my husband could move to a separate bed, but my idea of marriage has my husband in our bed, not my children. Different people have different ways of dealing with this problem, but I wonder if advocates of "family beds" can solve it? — Yours, etc.,

T. E. MOON.
May 25, 1984.

(4). May 31, 1984.

Getting children to sleep

Sir,—Most people embark on marriage with the assumption that both partners have identifiable needs, and both should as far as possible have them met. Sadly, most go into parenthood with little idea of what a child's needs might really be. When children fail to meet our preconceived expectations, we try to change the children rather than the expectations. A couple's need for the physical and emotional intimacy of a shared bed is widely accepted as important, yet dependent children are denied this, and their protests ignored. The "family bed" need not mean three people in a bed designed for two. Many parents install an extra bed adjoining their own, thus allowing for everyone's needs, rather than letting the needs of the parents override those of the children.—Yours, etc.,

CATHERINE GLUE.
May 29, 1984.
Add Hospital art-Hall

(5). June 1, 1984.

Getting children to sleep

Sir,—Whether or not children need to sleep with their parents is debatable. They certainly desire it, but then children desire all kinds of things that responsible parents are not going to give them. Most parents would have experienced screams of rage and frustration when they prevent their child from having or doing something it has set its heart on. Sleeping through the night in their own beds is just the same, and no parents need feel any more guilty than they would if they denied their child a chocolate bar every time they went to the shop. As for creating independent children, my daughter is very independent and confident; but I have seen several children of the same age who have been breastfed for a number of years and who sleep with mum and dad who will not leave mum's side. — Yours, etc.,

T. E. MOON.
May 31, 1984.

(6). June 4, 1984.

Getting children to sleep

Sir,—How tragic to lump together a child's desire to be comforted in times of anxiety and her desire for a chocolate bar. The child who screams from fear and loneliness in her solitary bedroom, and is always answered, but who screams for chocolate bars and is often ignored, learns that human love is more important than luxury food. The child whose cries are ignored, if inconvenient to her parents, regardless of what she is crying for, learns that her feelings are not important. The wisest statement I have heard about independence is "True independence is not 'not needing help', but knowing how to ask for help when you do need it." To do this, a person must trust the validity of her own feelings, and trust that others will care about her. Such trust can best be developed by a childhood history of asking for help and receiving it.—Yours, etc.,

CATHERINE GLUE.
June 1, 1984.

Letters to the Editor, Christchurch Press.

(7). June 5, 1984.

Getting children to sleep

Sir,—We have a child who slept badly from an early age. By six months she was waking six times a night. Having her sleep with us had no effect on the number of times she woke. While we may have been "answering her every need" during the night, being chronically tired ourselves meant that we were unable to function adequately as parents during the day. There must be a balance between the child's needs and the parents', both parties' quality of life being important. To solve our problem we used the excellent sleep programme offered by the university. Our child still wakes briefly most nights, but has gained the independence to cope happily by herself, crying only when in genuine distress. We have energy now for her and the rest of our lives. She has happier days resulting from her healthier sleeping pattern and the added routine in our lives. — Yours, etc.,

M. B. MOSS and
ALISON LOCKE.

June 4, 1984.

(8) & (9). June 6, 1984.

Getting children to sleep

Sir,—My personal growth through mothering three children has involved changes in expectations. In helpless despair we allowed our first child (at about 18 months) to cry-it-out when we failed to get him to sleep. Our expectations were in transition with our second child and at times I resisted her need of my closeness only to arrive yet again at the acceptance of her need. Our expectations totally revised, it has seemed so easy to follow our third child's cues and meet her needs. She sleeps in our enlarged bed when she indicates a readiness for sleep. When she wakes she usually breast-feeds back to sleep. There are numerous variations on the "family bed." My husband has a separate bed. Initially I found this enormously threatening, until we realised its possibilities as our "love nest" from which I can return to sleep with our child or children.—Yours, etc.,

C. GRIFFITHS.

June 2, 1984.

Sir, — The crucial issue in the "getting children to sleep" controversy (June 1,) is one of children's dependency needs and emotional development. Children are, by their state, not independent. Adults may achieve emotional maturity of which independence is one aspect. Most educationalists and psychologists generally define "infancy" as lasting until about the age of seven. Children deprived in infancy, in ways appropriate to them individually, have their growth towards independence halted or distorted. Conflict between being told "what is right" and what parents "feel to be right" is usually unresolved. Invariably it is the children who pay the price and the cycle of emotional deprivation continues for another generation. I sympathise with parents struggling to recognise and meet children's dependency needs. I am still struggling with mine. However in breaking the cultural conditioning, interfering with my biologically-based instinct to "mother" my children, I feel I am at least progressing. — Yours, etc.,

CHRISTINE D. ROWLANDS.

June 1, 1984.

(10). June 7, 1984.

Getting children to sleep

Sir, — Catherine Glue thinks that ignoring children's crying at night is teaching them that their needs are unimportant. I cannot agree. What it teaches them is that other people have needs as well, such as a need for a night's sleep, and that their desire to be with mum is not always as strong as mum's need for a night's sleep. As for always trusting other people if you are a woman it is far safer to learn that you can rely on yourself to cope with problems than rely on anyone else, especially a man. Most women are already too dependent. I want my daughters to be strong and self-reliant. I also think parents have a difficult enough job without people implying that all the world's social problems can be blamed on parents who make children sleep at night. — Yours, etc.,

T. E. MOON.

June 4, 1984.

(11). June 8, 1984.

Getting children to sleep

Sir,—M. B. Moss and Alison Locke (May 5) highlight the real anguish of parents whose broken nights interfere with their daytime functioning. The problem is all too common. Yet it ultimately comes back to expectations and acceptance. On the rare occasions when our first child woke at night (once or twice a night, for two or three nights in succession, when ill or teething), we were exhausted for days afterwards. Our second child, as well as going to bed around midnight, woke frequently every night for his first two years. Yet I never felt anything resembling the exhaustion I had had with our first. It seems that tiredness comes not from the amount of time spent awake each night, but from the amount of time spent tense and angry. Learning to see a few half-hours of wakefulness each night as interludes rather than intrusions made an immense difference to me.—Yours, etc.,

CATHERINE GLUE.

June 6, 1984.

(12). June 9, 1984.

Getting children to sleep

Sir, — I am amazed and angered by the pure selflessness that so many women have displayed recently regarding the issue of getting children to sleep. Why must women constantly regard themselves as a service industry to be used and discarded at others' convenience? Certainly, children need adequate parenting, love and shelter; but to devote one's self 24 hours a day to one's child(ren) and, on the way deny the original marital relationship of husband and wife by allowing a child to sleep in one's own bed and, in one case mentioned, banishing the husband to a separate bed, seems to me to be totally ridiculous. Why are so many women divorced when their children leave home? Why do so many women complain of 'empty nest syndrome'? One's relationship with one's child(ren) is, I believe, quality, not quantity. Perhaps children who cannot sleep during the night would do so if their mothers were secure, whole people. — Yours, etc.,

SHARON E. HUNTER.

June 6, 1984.

Letters to the Editor, Christchurch Press.

(13), (14) & (15). June 11, 1984.

Getting children to sleep

Sir,—Surely, whether a mother allows her child to sleep in her bed is not the deciding factor of how much she cares for her child. The child is only one member of a unit called a family, and the child's needs must be balanced against the rest of the family's. If parents cannot sleep with children next to them for fear of squashing them, because they turn and kick too much, they should train them to sleep in their own beds. A tired mother cannot give the same care and attention. No employer wants a tired husband. If the parents find they enjoy the child sharing the bed and it strengthens their bond, the practice suits the family unit. If there is more than one child, another weight has to be balanced. Each mother copes in the way that she is able, and the only important outcome is for a child to feel loved and wanted.—Yours, etc.,

R. W. HOSKINS.

June 6, 1984.

Sir,—Sacrificing a child's need to the parent's need as T. Moon indicates ("The Press," June 7), does not ensure independence in the child. Resulting self-reliance is born out of compliancy rather than choice. Yes, our culture reinforces and maintains dependency and passivity in women, unnecessarily, as it does independence and power in men. Through feminism, women have come into feeling awareness with their own unresolved dependency needs. Men's liberation movements allow men the realisation that their independence, strength and self-reliance is a facade. Underneath, men are fragile, vulnerable, "little" and afraid. Surely the parental task is to provide the environment whereby their child's dependency needs are metappropriately, and at the right time, in childhood. Hopefully the child-become-adult will be emotionally mature, independent, yet able to enter an interdependent relationship, to differentiate between sexual and sensual needs, to give and receive different types of love; able to parent.—Yours, etc.,

CHRISTINE D. ROWLANDS.

June 7, 1984.

Sir,—T. E. Moon's letter made me feel very sad. Can she really believe it is healthy to distrust other people? There is no shame in dependency: we are all dependent on each other. I, too, want my daughter to be strong, but I see this as more complex than self-sufficiency. My daughter, like me, has parents who have always loved her intensely, but not always in ways appropriate to her. She may, like me, respond inappropriately to becoming a parent herself. If this happens, I want her, as I did, to have the trust to go to someone and say: "I am afraid; I feel helpless. I need help; I need comfort; I need something I can't name, I only know I need it desperately." The trust to reach out for help is perhaps the most important thing we can give her. "No man is an island"—no woman either.—Yours, etc.,

CATHERINE GLUE.

June 7, 1984.

(16) & 17). June 12, 1984.

Getting children to sleep

Sir, — Christine D. Rowlands and Catherine Glue have now written a number of letters implying that children who sleep through the night in their own beds grow up with all sorts of emotional problems. Where is the evidence? Saying it happens is hardly enough. I slept through the night as a child in my own bed and as an adult I am "emotionally mature, independent, yet able to enter an interdependent relationship, to differentiate between sexual and sensual needs, to give and receive different types of love, etc." I cannot understand why family bed advocates are so dogmatic. Their way is the only way for everyone. They seem to be like crusading Christians looking for converts. Their attitude that they only are good parents is offensive. It's about time they ceased to see this issue in terms of black and white and realised there are grey areas. — Yours, etc.,

T. E. MOON.

June 11, 1984.

Sir,—Sharon E. Hunter, referring to full-time mothering as "a service industry" and a denial of the marital relationship, misses the point. Marriage is never a static condition, and need not be as restrictive as Sharon Hunter would like. A couple who have chosen to produce a baby find — whatever kind of parents they are — that their marriage is radically changed. Some struggle to maintain it as it was before the child's birth, but this is neither possible for the parents nor desirable for the child. An infant is intensely dependent and has complex needs: parents who come to terms with this reality can allow their relationship to grow and develop, and include their child. Children are not a disruptive by-product of marriage: they can be accepted as a fulfilment of the relationship and a shared joy for both partners. — Yours, etc.,

CATHERINE GLUE.

June 9, 1984.

(18). June 12, 1984.

Sir,—T. E. Moon's attack upon Catherine Glue's new thinking is society's way of stamping out independence ("The Press," June 7). I give full support to Catherine's idea not to care for and put yourself before others. I hope that parents read my letter before solving their children's sleeping problems with a dose of reasoning. Society's rules for bringing up children are wrong and silly. Products of such rubbish are reflected in children's behaviour — for instance, a child crying when it is isolated from its mother. A child who does not have a mother standing over it all the time stands a better chance at sleeping than a child who does and cannot face reality. The answer to why a child awakes crying for no apparent physical reason is also related to mother dependency. The unconscious reason for this is that the child comes to a point in the dream where his mother is not there. — Yours, etc.,

G. N. SMITH.

June 10, 1984.

Letters to the Editor, Christchurch Press.

(19) & (20). June 13, 1984.

Getting children to sleep

Sir,—Sharon Hunter (June 9) is critical of mothers who share their beds with their children. I wonder whether she personally knows any? To many of us, meeting the night-time needs of our children is just part of the reality of 24-hour parenting. Indeed, it takes "secure and whole people," as she puts it, to not feel threatened by the idea of giving to our children in this way. Parents who try to understand and meet the needs of their children do not feel "used and discarded." They see, as the years go by, what a valuable investment selfless loving is. They can happily release their children to adulthood without the pain of the "empty nest syndrome," knowing they have done the best possible job in helping the next generation towards security and wholeness. By the way, most family beds are very large and husband and wife usually sleep together like anyone else. — Yours, etc.,

ROSE ISDALE.
June 9, 1984.

Sir,—For the harrased parents who are trying to get children to sleep: an old remedy is to make a pillow of hops. It seems that the aroma has a pacifying effect on young and old alike. Try it. — Yours, etc.,

E. BROOKES,
Hawarden.
June 11, 1984.

(21) & (22). June 14, 1984.

Getting children to sleep

Sir,—My original objection was to people in positions of authority stating that leaving children to cry is an acceptable solution to "sleep problems." This is like saying that it is acceptable to hit or ridicule children. All these are understandable reactions by frustrated and desperate parents — they are not desirable "techniques." A baby cannot comprehend that his mother loves him — or even that she exists — if she is not within reach of his physical senses. Curiously, one correspondent sees it as "banishment" when a grown man sleeps alone, but not when a child, with no choice in the matter, sleeps alone. The child's parents are his only resource. I believe meeting a child's urgent needs leads to more stable adults; I know from my own experience that it leads to more relaxed childen and parents. — Yours, etc.,

CATHERINE GLUE.
June 12, 1984.

Sir,—As a competent father who once won a nap-changing contest on Plunket night, I wish to submit that to induce children to sleep, four basic rules apply: deal with hunger, discomfort (dirty naps), need for security, or teething problems. The first three are all controllable, teething is a cookie-crumbling problem. I suggest a snack, fresh dry naps, a hottie; maybe a rock in the cradle or a cuddle from mum. Teething, a roster is called for, mum on Mondays, Wednesdays and Fridays, and dad on Tuesdays, Thursdays and Saturdays. Sundays, toss up. A self-adjusted problem corrected by passage of time. — Yours, etc.,

W. JACKSON.
June 12, 1984.

(23) & (24). June 16, 1984.

Getting children to sleep

Sir, — In reply to T. Moon (June 12), the issue is how a child comes to sleep through the night in its own bed, and the "family bed" controversy is only one aspect. The point I have consistently developed in this debate, is that the parental task is the recognition, acceptance and meeting of their child's dependency needs, whatever they are—appropriately, individually and at the right time; in childhood. We are, perhaps, discussing parenting styles. Fundamental to my style, developed with parenting experience and my own emotional growth, is the blend of my intellectual aim to be a loving, caring, responsible parent, with my emotional capacity. I am not judging. I do not profess to be "good." I reiterate however, that the child, especially in infancy, is in a fragile state, and adults needs ideally should be delayed while meeting the more immediate needs of the child. — Yours, etc.,

CHRISTINE D. ROWLANDS.
June 12, 1984.

Sir, — Rose Isdale would now have us believe that doing the best possible job as parents consists only of having your children in your bed. How easy. No having to deal with temper tantrums as infants. Do not hear their reading, or help them with their maths. As for the teen-age years that should be really good. I suppose kids who have slept in their parent's beds do not get acne or painful menstruation, do not have emotional difficulties or problems adjusting to sexuality. As parents we all face these problems and deal with them as best we can. Most of us deal with them better after a good night's sleep and are better parents when we and our children sleep at night in our own beds. — Yours, etc.,

T. E. MOON.
June 13, 1984.

Article in the Listener magazine, Oct 13-19, 1984. (pp.23-24).

Playing the mind game

by Bruce Gooding

Can psychologists listen? Can psychologists listen to psychologists who disagree with them?

IF YOUR BABY persistently wakes and cries through the night, John Kirkland is one of the people you might ask for help. The Palmerston North psychologist works at the CrySOS clinic for crying babies in his home city. That same city has been hosting a conference of psychologists, and Kirkland is in full flight outlining the various remedies available to parents who are plagued by their babies' sleepless nights.

He is interrupted: "Excuse me. Why do you label the behavioural approach as 'Let 'em cry'?"

Kirkland responds: "I believe it is accurate to call that option 'Let 'em cry'..."

The questioner doesn't think so: "I would say the behaviouralists invariably use reinforcement, a reward for non-crying behaviour, as well as extinction."

Extinction may sound a desperate solution to the problems created by a crying baby. However, in psychological jargon, "extinction" simply means taking no action and letting the baby cry till it stops. So this is no life-or-death matter. However, a real struggle is taking place here.

Some 300 psychologists have gathered for this conference. What happens in the next five days shows there are more players in this mind game than the behaviouralists, who think abnormal behaviour can be modified with "appropriate reinforcement", and the family therapists, who hold that because most of us are dependent on our families, then the family — not just the individual — must be treated.

There are, for example, the psychoanalysts, Freudians among them, and a group rapidly gaining popularity — the holistic counsellors, who probe the makeup of the whole person, including his or her diet. Division in the ranks was evident at the conference — heightened by the organisers' tendency to divide the conference into sessions on the score of ideology as much as illness.

Many psychologists widened the splits by attending only those sessions that concurred with their particular line. One holistic counsellor, asked naively if he had enjoyed the behavioural papers on the first day, laughed uproariously: "You wouldn't drag me in there, mate." After a family therapy seminar, a brace of behaviouralists who had strayed into the opposition camp seemed most unhappy. "F***ing family therapists," said one, "I just get so pissed off that there's no outcome data presented with all the religiosity."

Most of the 300 psychologists here will never offer their advice to the community at large. More than three-quarters of them work in schools, prisons or psychiatric institutions or are academics in universities. But during the five days they will be presented with at least 130 papers. Subjects include child abuse, unemployment, industry training, glue sniffing and even video games. But back to crying babies...

The behaviouralists have their answer. You can solve the crying baby problem. Canterbury University's Kevin Moesbergen reported results from a New Zealand trial of "extinction plus reinforcement". He says that in one trial the sleeping problems of all 22 children were solved when they were left to cry and rewarded with stars on charts for those nights that they did sleep through. The success rate for a further 22 children given reinforcement alone was 82 per cent.

But if family therapy advocates were at that session, none asked Moesbergen if he had monitored the children to see if other behavioural problems had emerged as a result of leaving them to cry.

And if the behaviouralists attended the Kirkland session there was only that lone interjector. Other theories about crying

babies — such as the merits or pitfalls of the "give in" approach where distressed children are allowed into the parental bed, or the contention that crying babies are stuck with their problems for genetic reasons — were not debated.

Strange, since various contributors at conference sessions acknowledged that it was of crucial importance that we find out how best to treat crying children, because disturbed children often become disturbed and offending adults.

Article in the Christchurch Star, 28 June, 1984.

Many babies have sleep problems

About 40 per cent of babies have sleep problems at some stage, says a Christchurch researcher, Miss Carolyn Lawton.

That often means months of long broken nights and short tempers for parents.

Some become desperate, says Miss Lawton, who runs the University of Canterbury psychology department's sleep programme.

It is natural for babies to wake, especially up to the age of four months.

"It becomes a problem when the presence of parents becomes necessary for the child to get back to sleep," she says.

It also becomes a problem when parents become so tired they cannot function and provide the best care for their children.

Miss Lawton sidesteps the present controversy surrounding children's sleeping habits.

That's not what the programme is concerned with, she says. "We don't want to say what is right or wrong.

"Rather it is helping parents who want their child to sleep through the night on their own."

Miss Lawton says children can learn to sleep to a particular pattern.

She has dealt with about 15 children aged from six months to two years since she became involved in the programme at the end of last year.

Carolyn Lawton... natural for babies to wake.

"It has worked in every case and parents report they are very happy with results," she says.

The programme run by her predecessor, Ms Karen France, had also been successful in every case where parents had not deviated from instructions.

As well as providing a clinical service for parents, the sleep programme is Miss Lawton's masters thesis project.

Parents have to keep a diary of their child's sleeping habits for six to eight weeks after an individual plan has been devised for them.

The sleep pattern tends to stabilise after a month, Miss Lawton says.

She keeps a close eye on participants by getting regular progress reports over the telephone.

Miss Lawton is reluctant to give too many details because she says parents should not try to do the programme on their own.

This gives parents the techniques and support so they can withdraw and no longer be an integral part of the child's sleep cycle, she says.

It also helps parents develop some sort of routine in day-time and night-time sleep.

"The child learns what is expected."

Miss Lawton says children do not learn how to sleep on their own if they regularly sleep with their parents. So when they are no longer allowed in the parental bed they are likely to wake during the night.

Parents who have completed the programme often report that their relationship with their child has improved once the child is able to sleep through the night, Miss Lawton says.

"The grizzly child becomes happier and easier to manage."

The programme will be taking another 20 to 30 children with sleep problems, and their parents in "a couple of months," she says.

Appendix H.
General Practitioners' consent form for Study Three.

University of Canterbury Christchurch 1 New Zeala
Department of Psychology

16 November 1982

Dear Dr _____

_____ and his/her parents have been referred to the Infant Sleep Disturbance Project currently being run at the Psychology Department, University of Canterbury. The present study aims to investigate whether the administration of Trimeprazine, gradually faded over 10 days facilitates a concurrent behaviour management programme.

Once we have received a signed copy of this sheet _____ and his/her parents will be seen at the university by Dr Peter Wilkinson, the Medical Practitioner collaborating with the project, and Trimeprazine 30 mg/10 mls, or placebo 10 mls fading 2 mls every second day to 0 mls on the 10th day will be randomly prescribed.

Although the study is double-blind, Dr Wilkinson and one other member of staff will know which subjects receive placebo and which do not. They can be contacted should you be involved in any consultation for which this information may be necessary.

Please feel free to contact me directly should you have any queries.

Yours sincerely,

Karyn G. France, M.A., Dip.Clin.Psych., MNZPsS.
Lecturer in Psychology

Contact Telephone Nos. Karyn G. France: Business : 482-009 ext.8681
Private : 496-906

Dr P. Wilkinson: Surgery : 496-716
Private : 519-692

Dr Nirbhay Singh: Business : 482-009 ext. 8577
Private : 489-415

I consent to _____ being prescribed Trimeprazine 30 mg/10 mls in conjunction with a behaviour modification programme.

Signature: _____

Dear Dr _____

Please note:

1. The procedures currently being used in the Infant Sleep Disturbance project have been discussed with representatives of the Royal College of General Practitioners Canterbury Faculty Interim Ethical Committee and their approval has been received on 17 June 1983.

2. The 10 ml dose of Trimeprazine described is dilute and is equivalent to a standard 5 ml dose.

Yours sincerely,

Karyn G. France
Clinical Psychologist

Appendix I.
Parents information and consent forms for Study Three.

Department of Psychology
University of Canterbury Christchurch 1 New Zealand

Dear Parent/s,

Thank you for taking part in our research project. Infant sleep disturbance is very common and of some concern to many parents, however there is very little research regarding ways of managing it. The sleep research currently being undertaken within the Psychology Department aims to develop new ways and refine existing methods of managing infant sleep disturbance. The ultimate aim is to inform those responsible for advising parents, such as doctors, plunket nurses and psychologists, about our findings.

The part of the study you have been asked to join aims to evaluate Vallergan (trimeprazine tartrate), a mild sedative widely prescribed for children's sleep disturbance in conjunction with a behaviour management programme.

Your part in the study is as follows:

1. By this stage you will have your family Doctor's referral, or consent for Dr. Wilkinson to prescribe the medication.

2. You will be supplied with one bottle. This bottle may contain a sugar syrup, placebo, which will not contain the active drug (trimeprazine tartrate).

3. Neither the principal investigator (Karyn France), her research assistant, nor yourselves will know whether your child receives the sugar syrup or the active drug. This is a "double-blind" research design and is necessary for meaningful results to be obtained from the study. For safety however, the General Practitioner involved in the research (Dr. Peter Wilkinson), and another member of the department (Dr. Hirbhay Singh) do know, and should be contacted if at any stage you are in doubt regarding your child's response to the medication.

To ensure maximum safety, and good research practise, we require you to read the following statements and sign in the space below.

...(continued)

(a) I/we have read and understand the description of the research project above.

(b) I/we agree to give _____ the prescribed medication every night throughout the study according to the specific directions below. Any deviation from this will occur only after discussion with Karyn France and/or Dr. Wilkinson.

(c) I/we agree to continue filling in the record sheets throughout the study.

(d) Should I/we at any time be concerned about my/our child's response to the medication, I/we agree to contact Dr. Wilkinson (Surgery 496-716, Residence 585-580) or Dr. Singh (482-009 Ext. 8577, Residence 489-415) immediately and to discontinue medication until the matter has been discussed with one or both of them, as necessary.

Parent/s signatures:

_____ _____

Thank you again for taking part; please do not hesitate to make contact if you have any queries.

Karyn G. France,
DEPARTMENT OF PSYCHOLOGY.

CONTACT NUMBERS:

Karyn France	482-009	Ext. 8681	Residence 496-906
Peter Wilkinson	496-716	Surgery	Residence 585-580
Nirbhay Singh	482-009	Ext. 8577	Residence 489-415

Department of Psychology
University of Canterbury Christchurch 1 New Zealand

Dear

Thank you for taking part in the sleep study. By this stage you will have filled in more than six weeks of data sheets since we started the programme. I am enclosing some more questionnaires to be filled out and returned. I have enclosed a stamped/addressed envelope for you to use.

At this stage parents often ask how to maintain the gains their child has made while still being able to check their child if she/he wakes. I suggest that from now on you check when she/he wakes, see to her/his needs if necessary, otherwise immediately leave the room. Should you notice an increase in waking again, particularly after a disruption such as illness, an outing or a holiday, it may be necessary to return to the first phase of the programme for a few nights.

Could you please check that I have received:

1. Baseline recording.)
2. First questionnaires.) I may have these already.
3. Second questionnaires.
4. Recording over programme period.
5. Final questionnaires (enclosed).

Please do not hesitate to contact me if necessary.

Best wishes for the future,

Karyn G. France.

Appendix J.

Adaptation of the Flint Infant Security Scale (Flint 1984) used in Studies Three and Four.

Name: _____ Date: _____ Age: _____

Please UNDERLINE the statements applicable to your child over the last three days.

EATING

(D) Accepts new foods readily

- eats them with enjoyment
- eats them with caution
- eats them despite dislike of them

(D) Protests when new foods are offered

- refuses to taste
- turns away
- pushes mother's hand
- spits out
- cries

(E) Enthusiastic about food (bottle, solids)

- squeals
- gurgles
- slaps table
- smacks lips

(E) Uninterested in food

- avoids
- cries
- frets
- does not finish

(E) Accepts opportunity to feed (cup, spoon)

- tries when urged
- tries spontaneously

(E) Refuses to feed self when expected to do so

- refuses when urged
- makes no spontaneous effort

(D) Waits patiently when reassured that meal is coming

- relaxed
- contented

(D) Impatient despite reassurance that meal is coming

- whines
- cries

TOTAL: _____

UNFAMILIAR SITUATION

(D) Co-operates when unfamiliar person is in charge at meal time (baby-sitter, visitor)

- eats with caution
- eats with usual appetite

(D) Unco-operative unless familiar person is in charge at meal time

- refuses to eat
- whines and protests

(E) Sleeps readily in new bed or in new surroundings

- settles down within a few minutes
- goes to sleep in normal time

(E) Objects when placed in unfamiliar bed or new surroundings

- cries
- frets
- wakeful

(D) Co-operates when put to bed by an unfimiliar person (baby-sitter, visitor)

- accepts with caution
- accepts bed as usual

(D) Unco-operative when put to bed by unfimiliar person

- whines
- cries
- remains awake

CHANGING ENVIRONMENT

(E) Enjoys a change of environment (outside, shopping, visiting)

- watches with interest
- vocalizes happily

(E) Amuses self with vocal play

(E) Enjoys unusual tone of voice

- interested
- laughs

(D) Is willing to give up toys

- to parents
- to other children

(E) Eager for NEW toys

(E) Unhappy when environmentis changed

- apparently indifferent
- tense
- cries

(E) Rarely vocalizes

(E) Upset by unusual tone of voice

- whines
- cries

(D) Clings to own toys

- from parents
- from other children

(E) Withdraws from or ignores NEW toys

TOTAL: _____

SOCIAL

(E) Enjoys the presence of people other than his family

- approaches
- plays with

(E) Enjoys the company of children

- watches with interest
- enters into play

(D) Can accept shared attention with other children

- aware but unperturbed

(D) Likes to "converse" with others (vocalizing)

(E) Uncomfortable in the presence of other people

- turns to mother
- frets or cries

(E) Uncomfortable in the company of other children

- cries or whines
- wants mother

(D) Unhappy when other children receive attention

- cries
- pushes them away

(D) Apprehensive when talked to by strangers

- "clams up"
- tense
- cries

TOTAL: _____

PLAYING

(E) Manipulates play materials

- watches
- clutches
- mouths
- examines
- bangs
- explores possibilities
- enjoys noise
- keenly interested

(E) Restricted manipulation of play materials

- ignores
- apathetic towards
- seldom mouths
- seldom examines
- seldom bangs
- listless use
- little variety in use
- quickly loses interest

TOTAL: _____

UNFAMILIAR SITUATION CONT.

(D) Relaxed when bathed, washed, or toileted by unfamiliar person (visitor, baby-sitter)

(D) Can accept the sudden advances of a stranger

(D) Accepts being left alone with people other than family (neighbour, baby-sitter, infrequent visitor)

- co-operates
- enjoys

(D) Tense and uncertain when bathed, washed, or toileted by unfamiliar person

(D) Apprehensive of sudden advances from strangers

(D) Unhappy when left alone with peop other than family

- cries or whines
- refuses to co-operate

TOTAL: _____

SLEEPING

(D) Accepts without protest when put to bed

(E) Adjusts easily to a new position for sleep

(E) A sound sleeper (seldom wakes)

(E) A relaxed sleeper

- sprawls
- moves infrequently

(D) Protests when put to bed

- fusses
- cries

(E) Content only in familiar position sleep, e.g., back or stomach

(E) A fitful sleeper (wakes often)

(E) A restless sleeper

- cries out
- twitches
- jumps
- turns

TOTAL: _____

TOILETING AND BATHING

(D) Co-operates when being changed (diapers, sleepers, panties)

- accepts
- does what is expected of him
- does as directed (e.g., "Lie still a moment.")

(E) Relaxed when having a bowel movement

(E) Relaxed about toilet needs

- unconcerned if wet or soiled
- indicates need for dry clothes by pointing, clutching self, grunting
- asks to go to toilet when needed

(D) Unco-operative when being changed

- kicks
- rolls over
- cries
- protests
- pinches, hits

(E) Cries or tense when having a bowel movement

(E) Apprehensive about toilet needs

- must be changed at once
- constantly demands to go
- wakens crying for toilet

TOILETING AND BATHING CONT.

(E) Enjoys bath

- kicks and splashes
- plays
- squeals

(E) Apprehensive about bath

- cries
- becomes tense
- stiffens

TOTAL: _____

PHYSICAL EXPERIENCES

(D) Enjoys rough play (bouncing, dandling, tossing, pushing)

- giggles, laughs
- anticipates with delight
- asks for more

(D) Dislikes rough play

- cries or screams
- becomes tense
- runs away

(E) Recovers readily when physically hurt or feelings are hurt

- can be comforted
- cheers up in a short time

(E) Upset for a long while if physically hurt or if feelings are hurt

- sobs, cries, or pouts despite adult reassurance

(D) Enjoys being cuddled

- snuggles in
- feels at ease

(D) Dislikes being cuddled

- squirms
- restless
- pushes away

(E) Enjoys physical activity

- kicks
- rolls over
- bounces
- crawls
- climbs

(E) Little spontaneous physical activity

- seems listless
- seems apathetic

(E) Amuses self happily in fairly restricted play area (play pen, part of room)

(E) Cries or whines when in restricted play area

(D) Accepts interference with his own physical activity (being picked up, being dressed)

- co-operates

(D) Unhappy when his physical activity is interfered with

- cries
- whines
- kicks

(E) Enjoys car rides

(E) Restless or becomes ill riding in cars

(E) Enjoys a crowd

- squeals, smiles, gurgles
- moves about freely

(E) Unhappy in a crowd

- cries
- clings to mother

(E) Generally relaxed

(E) Generally tense

- frequently sucks thumb or fingers
- frequently rocks
- frequently pulls own hair
- frequently has temper tantrums

TOTAL: _____

Appendix K.

Raw Data,Study Three.

Key: column 2 = group where: group 1= active medication group
group 2 = placebo group
group 3 = extinction group

Key: Column 2 = group
Column 3 = baseline
Column 4 = 1st 10 days of intervention
Column 5 = 2nd 10 days of intervention
Column 6 = 3rd 10 days of intervention
Column 7 = follow-up

Duration of awakening

1	1	21.0	5.0	2.0	.6	0
2	1	24.0	29.0	15.0	5.0	15.0
3	1	8.8	7.0	5.6	2.5	.9
4	1	18.1	4.5	4.2	2.5	3.1
5	1	20.0	25.5	2.0	4.0	0
6	1	25.4	5.6	2.5	0	•
7	1	14.9	0	27.0	7.0	0
8	1	36.0	25.1	16.5	17.9	.4
9	1	66.1	16.5	15.3	26.1	0
10	1	56.1	.8	7.9	1.0	.6
11	2	20.9	60.6	17.5	3.6	0
12	2	31.8	22.2	4.4	4.5	0
13	2	13.0	7.4	2.3	3.9	.6
14	2	10.0	30.3	0	5.0	9.9
15	2	28.9	37.5	7.5	6.1	0
16	2	36.0	41.0	2.0	10.7	0
17	2	53.4	48.4	0	0	•
18	2	35.4	13.5	6.0	15.0	•
19	2	58.3	36.5	52.5	22.7	13.9
20	2	28.4	18.5	27.0	0	1.4
21	2	57.5	14.5	27.0	7.0	0
22	2	70.8	60.7	4.5	4.7	2.1
23	3	14.3	12.0	5.5	4.5	0
24	3	32.3	15.2	.9	18.8	.6
25	3	6.4	12.0	0	.1	1.4
26	3	31.8	62.0	22.0	8.2	5.7
27	3	7.1	20.0	2.0	1.5	.4
28	3	28.6	15.1	1.6	.3	0
29	3	12.9	18.0	3.5	0	•
30	3	49.6	49.8	24.3	7.5	•
31	3	40.5	62.8	3.7	14.2	1.4
32	3	23.6	24.0	4.4	15.5	39.6
33	3	26.5	21.5	9.3	0	•
34	3	16.0	10.6	25.1	29.8	6.0
35	3	8.6	20.2	4.5	.5	.2

Frequency of awakening

1	1	2.0	.8	.7	.3	0
2	1	2.1	1.4	.6	.2	1.7
3	1	3.3	1.1	1.4	1.5	.5
4	1	1.7	.2	.5	.3	.5
5	1	2.0	.7	.3	.5	0
6	1	1.0	.6	.2	0	•
7	1	2.5	0	1.4	.5	0
8	1	4.9	.7	.8	.5	.1
9	1	1.2	.6	.7	1.3	0
10	1	5.5	.2	1.2	.1	.4
11	2	1.0	1.5	.7	.3	.2
12	2	2.0	1.6	.6	.4	0
13	2	3.8	2.7	1.2	2.2	.3
14	2	5.0	1.2	0	.1	.8
15	2	2.6	1.2	.4	.4	.8
16	2	2.4	1.5	.2	.4	0
17	2	5.4	2.8	0	0	•
18	2	1.0	.3	.2	.3	•
19	2	1.2	.5	.8	.6	1.0
20	2	1.2	.3	.2	0	.2
21	2	1.1	.3	.3	.5	0
22	2	4.4	3.0	.7	.3	1.0
23	3	.9	1.0	.5	.1	0
24	3	2.7	1.7	1.0	1.0	.2
25	3	.6	.1	0	1.0	.1
26	3	1.4	1.5	.7	.6	.6
27	3	.9	.7	.4	.3	.1
28	3	1.2	1.3	.5	.4	0
29	3	1.6	1.5	.2	0	•
30	3	3.3	1.7	1.9	.2	•
31	3	2.8	1.4	.8	2.1	.6
32	3	1.4	1.1	.4	.3	.4
33	3	4.6	1.5	.5	0	•
34	3	1.3	.8	1.2	.9	.3
35	3	.9	.9	.1	.1	.2

Key: Column 2 = group
Column 3 = baseline
Column 4 = 3rd day of intervention
Column 5 = beginning of maintenamce
Column 6 = follow-up

Flint

1	1	38	45	41
2	1	28	40	31
3	1	30	45	52
4	1	39	44	45
5	1	32	29	43
6	1	39	38	24
7	1	44	35	39
8	1	16	38	34
9	1	21	52	52
10	1	14	34	33
11	2	21	25	19
12	2	30	33	24
13	2	38	42	44
14	2	33	36	34
15	2	33	42	29
16	2	50	46	41
17	2	38	44	45
18	2	31	45	42
19	2	16	20	26
20	2	24	43	26
21	2	-28	-1	16
22	2	16	33	45
23	3	21	33	18
24	3	32	33	42
25	3	34	33	32
26	3	45	45	44
27	3	26	31	41
28	3	39	43	43
29	3	24	34	50
30	3	39	38	44
31	3	29	18	35
32	3	27	33	38
33	3	27	22	24
34	3	22	27	33
35	3	34	37	41

Mother A-State

1	1	25	26	30	23
2	1	43	44	30	30
3	1	26	27	23	24
4	1	37	28	27	33
5	1	39	45	26	23
6	1	38	39	44	.
7	1	30	32	32	28
8	1	48	29	23	35
9	1	57	45	28	44
10	1	38	27	29	32
11	2	52	42	33	51
12	2	28	26	35	36
13	2	34	40	35	32
14	2	50	47	35	42
15	2	47	45	31	44
16	2	40	30	40	25
17	2	44	42	23	.
18	2	43	35	44	39
19	2	54	35	43	31
20	2	44	37	38	51
21	3	30	31	24	.
22	3	27	22	24	29
23	3	47	45	26	25
24	3	36	25	20	30
25	3	33	32	24	23
26	3	41	34	36	36
27	3	26	26	31	.
28	3	21	21	22	.
29	3	36	32	28	25
30	3	42	40	32	44
31	3	35	35	50	45
32	3	41	33	34	29

Father A-State

1	1	25	28	30	23
2	1	31	40	27	32
3	1	32	30	35	28
4	1	28	30	23	32
5	1	52	53	35	.
6	1	32	30	32	45
7	1	44	42	39	58
8	1	33	28	39	42
9	2	24	20	20	41
10	2	31	25	26	34
11	2	42	33	37	34
12	2	48	35	43	53
13	2	47	41	28	38
14	2	28	26	27	22
15	2	38	45	30	.
16	2	33	39	40	41
17	2	26	26	39	22
18	3	33	31	25	26
19	3	24	22	21	35
20	3	30	27	23	24
21	3	33	41	35	37
22	3	36	39	33	.
23	3	27	32	29	.
24	3	27	31	34	27
25	3	53	46	45	53
26	3	30	30	30	31
27	3	32	25	25	32

Appendix L.
Information for doctor's receptionists and parents, Study Four.

INFORMATION FOR DOCTOR'S RECEPTIONIST/S

I have been involved over the past five years in a series of studies investigating infant's sleep and other common behaviours, as well as parents reactions over various stages of their children's development.

I have collected all the data except for a final check on the questionnaires I have used, in order to compare the results with normal children who have not presented to the sleep project.

We require children who do wake at night as well as those who don't, i.e. the child's sleep pattern is not important for this part of the study.

The parent/s will be asked to fill in several sets of questionnaires over the next few weeks and then finally at six to 18 months hence. The questionnaires comprise two on common child behaviour patterns and one for each parent on parental reactions.

Your part in the study is as follows:

(1) Approach each parent who arrives to see Dr _____ who has a child between the ages of six months to 24 months old. It does not matter if the child attends with them or not.

(2) Ask the child if he/she would be prepared to consider taking part in the study. Show them the parents information sheet. If they are prepared to consider taking part take name and contact number. Assure them that this does not commit them to taking part. They will be contacted by Jill Husband my research assistant, and can give her their final decision.

(3) In order to give us a good margin we would appreciate 15-20 names being collected.

(4) I shall collect the names when they are ready and organise contact from that point on.

Thank you for your co-operation.

Karyn G. France
Clinical Psychologist

Contact numbers: Karyn France
Home : 496-906
Work : 792-900/629

Jill Husband
478-671

Parent's Information Sheet

Dear Parent/s,

Thank you for considering taking part in my study. Over the past five years I have been involved in a series of studies investigating infant's sleep and other common behaviours. I have also looked at parents reactions over various stages of their children's development.

I have collected all the data except for a final check on the questionnaires I have been using on families who have not presented to the sleep project.

Your child's sleep pattern is not important for this study. We wish to include children who sleep through as well as children who wake at night although if you have ever had help from a professional in following a programme to modify you child's sleep it would not be appropriate for you to take part.

If you sign this paper you will be contacted by Mrs Jill Husband, my research assistant. She will obtain your final decision regarding taking part. Solo parents are welcome to be included, in families where there are two parents we would appreciate both parents filling in the parent reaction questionnaires.

All information will be CONFIDENTIAL to my research assistant and myself. The questionnaires on the whole ask questions about everyday things, however, should you now or after seeing the questionnaires wish your replies to be completely confidential your replies can be sealed and we will use a number code system.

Should you agree to take part you will be given four sets of questionnaires, three over the next few weeks and a final set in six to 18 months time.

Should you have any questions they will be answered when Jill contacts you, however, our contact numbers are at the end of this sheet.

Thank you.

Karyn G. France
Clinical Psychologist

Contact numbers: Karyn France 496-906. Jill Husband 478-671

Name: _____ Contact No. _____

Please list any times you would prefer not to be rung _____

Dear Parents,

Thank you for agreeing to fill out the questionnaires that I have been using in the University Sleep Project. The information will be used for comparison purposes only and is essential to help us understand the information we have gathered together so far.

My research assistant is Jill Husband. She will contact you regularly. We will ask you to fill out questionnaires at four different times. The questionnaires comprise some or all of the following.

1. A set of questions about your child's sleep.

2. A set of questions about common childhood behaviours which are typical of the age group we are considering.

3. A set of questions about your reactions at various points. This is important as part of what we are considering is the impact on parents of various stages of their child's development.

Please note any illness over period on the questionnaires.

If you have any difficulty at all all do not hesitate to phone Jill or me at the following numbers.

Karyn France 496-906 Jill Husband 478-671

Appendix M.

Sleep Questionnaire Study Four.

Child's name: _____ Date: _____

Please circle one choice for each question.

On average, over the last two weeks, how long has your child taken to settle after first placing in bed?

0 min | 15 min | 30 min | 45 min | 1 hour or more

How many nights has night waking occurred?

0 | 1-2 | 3-4 | 5-6 | 7 nights per week

How many times has he or she woken each night?

0 | 1-2 | 3-4 | 5-6 | 7 or more

When he or she woke, how much time was spent awake each night?

0 | 10 min | 20 min | 45 min | 1 hour or more

How many hours sleep has your child had each day, i.e. day and night sleep minus wakings?

More than 12 | 11 | 10 | 9 | 8 or fewer hours

To what extent has your child had access to your bed?

Never	Only briefly, if awake, then back to his/her own bed.	We put him/her back once then allow him/her to stay in our bed the rest of the night.	He/she goes down in his/her bed but stays in our bed all night after first waking.	She/he goes down in our bed, we lie with him/her until asleep.

We have used medication in order to help our child sleep

Not at all | 1-2 nights | 3-4 nights | 5-6 nights | 7 nights | Weekly

Appendix N

Child Behaviour Characteristics Scale (Borgatta and Fanshel (1970).

NAME OF CHILD: _____ DATE: _____

To what extent has the following been a feature of your child's behaviour over the last 3 days?

Please TICK one of the following categories.

		Never	Rarely	Sometimes	Often	Almost Always
1.	Is physically active, vigorous.					
2.	Is alert.					
3.	Is friendly.					
4.	Is interested in what goes on.					
5.	Has a nice dispostiton.					
6.	Is likeable.					
7.	Is cheerful.					
8.	Cannot grasp explanations.					
9.	Loses track of what is going on.					
10.	Has a good appetite.					
11.	Responds quickly.					
12.	Is fidgety.					
13.	Is pleasant.					
14.	Laughs.					
15.	Gets upset easily.					
16.	Shows warmth and Affection.					

	Never	Rarely	Sometimes	Often	Almost Always
17. Is curious about things around him.					
18. Is gloomy or sad looking.					
19. Gets confused easily.					
20. Has a lot of pep and energy.					
21. Smiles.					
22. Is tense.					
23. Pays attention to things going on.					
24. Appears sulky or sour.					
25. Is agreeable.					
26. Eats well.					
27. Is irritable.					
28. Is bright.					
29. Is easily quieted or calmed down.					
30. Is restless.					
31. Is fearful and anxious.					
32. Is sluggish or listless.					
33. Cannot grasp explanations.					
34. Is easy to take care of.					

	Never	Rarely	Sometimes	Often	Almost Always
35. Fusses and frets.					
36. Is easily satisfied or pacified.					
37. Is overly excited easily.					
38. Is fearful and anxious.					
39. Rejects strangers.					
40. Is stubborn.					
41. Does not warm up to people.					
42. Gets distracted easily.					
43. Is lively and active.					
44. Is slow to understand people.					
45. Is overly emotional.					
46. Is co-operative.					
47. Withdraws from people.					
48. Is very tense.					
49. Mind wanders easily.					
50. Is defiant.					
51. Is cautious with strangers.					

	Never	Rarely	Sometimes	Often	Almost Always
52. Is overly nervous.					
53. Is easy to train.					
54. Is moody.					
55. Is resistant.					
56. Is smart, (BRIGHT).					
57. Loses interest in things easily.					
58. Does what people want him to do.					
59. Has difficulty learning things.					
60. Is patient.					

Appendix O.

Raw Data, Study Four.

Key: column 2 = group where: group 1= active medication group
group 2 = placebo group
group 3 = extinction group
group 4 = normal sleep controls
group 5 = sleep disturbed controls

Flint

Key: column 2 = group
column 3 = baseline
column 4 = 3rd day of intervention
column 5 = beginning of maintenance

1	1	38	45	41
2	1	28	40	31
3	1	30	45	52
4	1	39	44	45
5	1	32	29	43
6	1	39	38	24
7	1	44	35	39
8	1	16	38	34
9	1	21	52	52
10	1	14	34	33
11	2	21	25	19
12	2	30	33	24
13	2	38	42	44
14	2	33	36	34
15	2	33	42	29
16	2	50	46	41
17	2	38	44	45
18	2	31	45	42
19	2	16	20	26
20	2	24	43	26
21	2	-28	-1	16
22	2	16	33	45
23	3	21	33	18
24	3	32	33	42
25	3	34	33	32
26	3	45	45	44
27	3	26	31	41
28	3	39	43	43
29	3	24	34	50
30	3	39	38	44
31	3	29	18	35
32	3	27	33	38
33	3	27	22	24
34	3	22	27	33
35	3	34	37	41
36	4	40	42	38
37	4	36	38	39
38	4	-3	5	9
39	4	29	30	17
40	4	41	37	27
41	4	24	20	32
42	4	28	36	24
43	4	41	36	35
44	4	41	38	41
45	4	22	33	39
46	4	38	42	30
47	4	42	38	35
48	4	45	28	42
49	4	38	36	36
50	4	44	47	37
51	5	29	41	33
52	5	32	35	32
53	5	27	30	25
54	5	42	46	41
55	5	41	48	33
56	5	39	38	39
57	5	39	38	43
58	5	32	38	31
59	5	44	47	47
60	5	37	40	36
61	5	38	43	36
62	5	25	32	34
63	5	28	34	50

SBS

column 2 = group
column 3 = baseline
column 4 = 3rd 10 days of intervention
column 5 = follow-up

1	1	10	3.5	0
2	1	9	7.0	5.5
3	1	10	7.0	4.0
4	1	7	3.0	2.5
5	1	8	4.0	1.0
6	1	8	1.5	.
7	1	11	5.5	1.0
8	1	10	6.0	2.0
9	1	15	5.5	2.0
10	1	12	4.5	3.0
11	2	9	5.5	2.0
12	2	12	6.0	2.0
13	2	13	5.0	3.0
14	2	19	0	4.0
15	2	16	3.5	6.0
16	2	11	5.0	.5
17	2	13	1.0	.
18	2	12	4.0	.
19	2	11	8.5	6.0
20	2	7	2.5	2.0
21	2	11	3.0	1.0
22	2	16	3.5	5.0
23	3	13	6.5	2.5
24	3	11	2.0	3.0
25	3	9	7.0	4.0
26	3	6	2.0	1.5
27	3	15	2.5	0
28	3	12	0	.
29	3	13	6.0	.
30	3	12	5.0	3.5
31	3	7	5.0	6.0
32	3	16	1.5	2.5
33	3	8	0.0	.
34	3	6	3.0	1.2
35	3	8	4.5	1.0
36	4	4	4.0	4.0
37	4	4	4.0	4.0
38	4	4	5.0	3.0
39	4	3	4.0	0
40	4	0	0	0
41	4	4	4.0	4.0
42	4	1	5.0	.
43	4	2	3.0	2.0
44	4	2	3.0	3.0
45	4	0	0	.
46	4	4	0	2.0
47	4	0	2.0	.
48	4	2	4.0	0
49	4	2	4.0	2.0
50	4	0	3.0	4.0
51	5	9	6.0	.
52	5	8	7.0	5.0
53	5	5	8.0	6.0
54	5	0	3.0	.
55	5	6	6.0	6.0
56	5	8	9.0	6.0
57	5	10	8.0	.
58	5	5	4.0	3.0
59	5	8	7.0	10.0
60	5	10	4.0	5.0
61	5	7	5.0	6.0
62	5	5	4.0	.

CBC SCORES

Key: for all CBC factors:

column 2 = group
column 3 = baseline
column 4 = 3rd day of intervention
column 5 = beginning of maintenance
column 6 = follow-up

CSIa

1	1	20.0	23.0	23.0	23.0
2	1	20.0	23.0	23.0	24.0
3	1	20.0	19.0	19.0	20.0
4	1	22.0	23.0	23.0	24.0
5	1	24.0	23.0	24.0	24.0
6	1	18.0	18.0	21.0	•
7	1	24.0	24.0	24.0	24.0
8	1	16.0	14.0	20.0	21.0
9	1	24.0	22.0	24.0	24.0
10	1	24.0	24.0	24.0	22.0
11	2	21.0	22.0	23.0	23.0
12	2	22.0	22.5	22.0	20.0
13	2	20.0	21.0	20.0	20.0
14	2	24.0	24.0	23.0	20.0
15	2	22.0	22.0	21.0	20.0
16	2	20.0	20.0	20.0	24.0
17	2	14.0	20.0	20.0	•
18	2	24.0	22.0	23.0	•
19	2	24.0	22.0	18.0	20.0
20	2	22.0	22.0	22.0	16.0
21	2	19.0	18.0	20.0	24.0
22	2	24.0	24.0	24.0	22.0
23	3	17.0	18.0	18.5	19.0
24	3	24.0	24.0	24.0	24.0
25	3	23.0	23.0	24.0	23.0
26	3	23.0	24.0	24.0	24.0
27	3	23.0	23.0	24.0	24.0
28	3	22.0	21.0	22.0	22.0
29	3	23.0	22.0	24.0	•
30	3	24.0	21.0	22.0	•
31	3	22.0	20.0	23.0	24.0
32	3	23.0	23.0	20.0	23.0
33	3	24.0	22.0	20.0	22.0
34	3	16.0	19.0	21.0	21.0
35	3	20.0	22.0	22.0	24.0
36	4	17.0	20.0	21.0	22.0
37	4	21.0	20.0	19.0	16.0
38	4	20.0	17.0	16.0	20.0
39	4	24.0	22.0	24.0	23.0
40	4	22.0	21.0	24.0	24.0
41	4	23.0	22.0	23.0	21.0
42	4	22.0	21.0	20.0	•
43	4	18.0	16.0	21.0	19.0
44	4	24.0	24.0	24.0	21.0
45	4	24.0	22.0	22.0	•
46	4	24.0	19.0	18.0	23.0
47	4	17.0	15.0	16.0	•
48	4	24.0	21.0	20.0	24.0
49	4	24.0	24.0	24.0	21.0
50	4	24.0	24.0	23.0	23.0
51	5	21.0	19.0	19.0	20.0
52	5	22.0	22.0	19.0	21.0
53	5	23.0	20.0	20.0	21.0
54	5	22.0	18.0	17.0	•
55	5	24.0	24.0	24.0	23.0
56	5	24.0	22.0	22.0	22.0
57	5	23.0	24.0	20.0	24.0
58	5	20.0	19.0	18.0	18.0
59	5	24.0	24.0	22.0	24.0
60	5	24.0	24.0	24.0	21.0
61	5	19.0	18.0	20.0	18.0
62	5	24.0	22.0	23.0	•

CSII

1	1	4.000	3.000	3.000	5.000
2	1	5.000	6.000	5.000	2.000
3	1	5.000	5.000	5.000	5.000
4	1	4.000	6.000	5.000	3.000
5	1	6.000	0.000	7.000	6.000
6	1	9.000	9.000	6.000	•
7	1	6.000	6.000	7.000	3.000
8	1	2.000	2.000	1.000	2.000
9	1	6.000	6.000	4.000	4.000
10	2	7.000	7.000	6.000	5.000
11	2	7.000	7.000	8.000	9.000
12	2	5.000	6.000	3.000	5.000
13	2	6.000	6.000	6.000	9.000
14	2	4.000	5.000	6.000	4.000
15	2	8.000	9.000	8.000	•
16	2	5.000	6.000	3.000	•
17	2	4.000	3.000	4.000	5.000
18	2	3.000	4.000	7.000	5.000
19	2	13.000	8.000	9.000	5.000
20	2	7.000	6.000	9.000	7.000
21	3	10.000	9.000	9.500	6.000
22	3	8.000	8.000	6.000	3.000
23	3	8.000	6.000	7.000	8.000
24	3	6.000	7.000	7.000	8.000
25	3	6.000	7.000	8.000	7.000
26	3	7.000	6.000	4.000	4.000
27	3	7.000	8.000	4.000	•
28	3	3.000	2.000	5.000	•
29	3	9.000	6.000	7.000	6.000
30	3	6.000	7.000	7.000	5.000
31	3	5.000	9.000	7.000	7.000
32	3	9.000	8.000	9.000	0.000
33	3	6.000	6.000	6.000	5.000
34	4	7.000	8.000	8.000	6.000
35	4	7.000	8.000	7.000	7.000
36	4	9.000	9.000	11.000	7.000
37	4	3.000	3.000	2.000	3.000
38	4	5.000	3.000	4.000	5.000
39	4	6.000	7.000	4.000	6.000
40	4	6.000	6.000	6.000	•
41	4	9.000	7.000	9.000	10.000
42	4	3.000	0	0	5.000
43	4	6.000	5.000	6.000	•
44	4	5.000	5.000	4.000	4.000
45	4	7.000	8.000	7.000	•
46	4	8.000	9.000	8.000	7.000
47	4	3.000	4.000	4.000	3.000
48	4	10.000	9.000	7.000	6.000
49	5	3.000	4.000	1.000	2.000
50	5	10.000	10.000	8.000	5.000
51	5	6.000	6.000	5.000	5.000
52	5	8.000	7.000	7.000	•
53	5	2.000	1.000	3.000	5.000
54	5	5.000	4.000	4.000	6.000
55	5	7.000	7.000	4.000	2.000
56	5	5.000	4.000	4.000	5.000
57	5	6.000	11.000	7.000	10.000
58	5	5.000	4.000	4.000	5.000
59	5	5.000	6.000	6.000	5.000
60	5	6.000	6.000	4.000	•

CSV

1	1	31.0	32.0	31.0	31.0
2	1	28.0	29.0	32.0	30.0
3	1	27.0	25.0	27.0	22.0
4	1	20.0	29.0	29.0	30.0
5	1	26.0	31.0	26.0	31.0
6	1	20.0	20.0	23.0	•
7	1	20.0	17.0	24.0	29.0
8	1	22.0	25.0	24.0	25.0
9	1	23.0	26.0	30.0	31.0
10	1	29.0	38.0	38.0	22.0
11	2	21.0	25.0	22.0	21.0
12	2	15.0	17.0	21.0	17.0
13	2	24.0	24.0	21.0	21.0
14	2	30.0	29.0	27.0	23.0
15	2	22.0	22.0	26.0	24.0
16	2	18.0	22.0	22.0	•
17	2	22.0	23.0	23.0	•
18	2	18.0	26.0	20.0	18.0
19	2	23.0	27.0	24.0	24.0
20	2	18.0	22.0	25.0	29.0
21	2	14.0	20.0	23.0	17.0
22	3	30.0	22.0	21.5	31.0
23	3	34.0	33.5	36.0	35.0
24	3	25.0	23.0	26.0	30.0
25	3	22.0	25.0	24.0	17.0
26	3	22.0	21.0	25.0	25.0
27	3	25.0	27.0	22.0	28.0
28	3	32.0	34.0	36.0	•
29	3	32.0	25.0	32.0	•
30	3	21.0	24.0	25.0	30.0
31	3	27.0	28.0	23.0	22.0
32	3	31.0	26.0	26.0	23.0
33	3	21.0	24.0	20.0	26.0
34	3	22.0	31.0	26.0	35.0
35	4	27.0	26.0	24.0	25.0
36	4	28.0	28.0	26.0	27.0
37	4	19.0	19.0	18.0	23.0
38	4	25.0	26.0	25.0	26.0
39	4	30.0	31.0	30.0	30.0
40	4	24.0	26.0	20.0	26.0
41	4	27.0	26.0	24.0	•
42	4	24.0	21.0	22.0	16.0
43	4	35.0	34.0	31.0	31.0
44	4	26.0	28.0	25.0	•
45	4	38.0	27.0	26.0	32.0
46	4	18.0	18.0	10.0	•
47	4	29.0	18.0	27.0	27.0
48	4	29.0	26.0	24.0	21.0
49	4	32.0	32.0	34.0	32.0
50	5	33.0	27.0	24.0	33.0
51	5	22.0	21.0	20.0	23.0
52	5	31.0	28.0	29.0	29.0
53	5	29.0	23.0	20.0	•
54	5	34.0	36.0	34.0	29.0
55	5	18.0	19.0	21.0	27.0
56	5	25.0	25.0	22.0	27.0
57	5	28.0	26.0	27.0	28.0
58	5	20.0	20.0	17.0	15.0
59	5	36.0	36.0	34.0	26.0
60	5	29.0	28.0	26.0	25.0
61	5	26.0	24.0	29.0	•

CSVII

1	1	23.0	23.0	23.0	24.0
2	1	24.0	25.0	24.0	24.0
3	1	18.0	17.0	18.0	18.0
4	1	23.0	27.0	28.0	28.0
5	1	23.0	22.0	25.0	25.0
6	1	26.0	21.0	26.0	•
7	1	25.0	10.0	21.0	26.0
8	1	22.0	19.0	28.0	25.0
9	1	21.0	22.0	28.0	27.0
10	1	25.0	28.0	28.0	18.0
11	2	14.0	18.0	17.0	12.0
12	2	14.0	12.0	18.0	15.0
13	2	23.0	18.0	18.0	18.0
14	2	23.0	23.0	19.0	22.0
15	2	17.0	17.0	20.0	21.0
16	2	17.0	17.0	17.0	20.0
17	2	12.0	18.0	21.0	•
18	2	22.0	20.0	23.0	•
19	2	21.0	21.0	22.0	18.0
20	2	18.0	21.0	21.0	18.0
21	2	15.0	14.0	12.0	23.0
22	2	13.0	19.0	22.0	16.0
23	3	21.0	17.0	21.5	23.0
24	3	27.0	24.5	26.0	27.0
25	3	22.0	20.0	27.0	23.0
26	3	23.0	24.0	21.0	19.0
27	3	17.0	17.0	24.0	23.0
28	3	24.0	21.0	21.0	23.0
29	3	22.0	22.0	25.0	•
30	3	28.0	17.0	27.0	•
31	3	21.0	21.0	23.0	23.0
32	3	12.0	13.0	18.0	22.0
33	3	25.0	21.0	20.0	21.0
34	3	17.0	17.0	19.0	19.0
35	3	23.0	23.0	23.0	24.0
36	4	20.0	23.0	23.0	23.0
37	4	21.0	22.0	21.0	21.0
38	4	15.0	16.0	12.0	14.0
39	4	22.0	20.0	19.0	19.0
40	4	26.0	28.0	28.0	26.0
41	4	25.0	26.0	22.0	22.0
42	4	17.0	21.0	17.0	•
43	4	20.0	18.0	20.0	11.0
44	4	20.0	28.0	24.0	27.0
45	4	17.0	21.0	23.0	•
46	4	26.0	19.0	17.0	19.0
47	4	15.0	15.0	14.0	•
48	4	20.0	15.0	22.0	23.0
49	4	23.0	26.0	19.0	18.0
50	4	27.0	26.0	23.0	23.0
51	5	23.0	22.0	15.0	18.0
52	5	23.0	20.0	15.0	19.0
53	5	25.0	20.0	23.0	23.0
54	5	19.0	18.0	18.0	•
55	5	26.0	28.0	26.0	25.0
56	5	20.0	15.0	15.0	17.0
57	5	23.0	24.0	16.0	23.0
58	5	26.0	20.0	20.0	18.0
59	5	27.0	27.0	23.0	26.0
60	5	28.0	27.0	26.0	26.0
61	5	24.0	21.0	22.0	21.0
62	5	20.0	17.0	23.0	•

CSVIII

1	1	8,0	7,0	7,0	5,0
2	1	11,0	12,0	15,0	15,0
3	1	15,0	10,0	10,0	13,0
4	1	7,0	11,0	6,0	3,0
5	1	26,0	23,0	22,0	14,0
6	1	20,0	15,0	13,0	•
7	1	13,0	20,0	12,0	12,0
8	1	27,0	14,0	12,0	21,0
9	1	14,0	13,0	13,0	22,0
10	2	17,0	8,0	6,0	15,0
11	2	18,0	12,0	12,0	21,0
12	2	9,0	9,0	12,0	9,0
13	2	14,0	16,0	21,0	17,0
14	2	16,0	19,0	10,0	15,0
15	2	7,0	11,0	8,0	9,0
16	2	14,0	18,0	14,0	•
17	2	5,0	5,0	3,0	•
18	2	9,0	4,0	5,0	10,0
19	2	19,0	5,0	24,0	20,0
20	2	32,0	23,0	24,0	15,0
21	2	18,0	11,0	7,0	18,0
22	3	18,0	24,0	15,0	15,0
23	3	9,0	8,0	8,0	8,0
24	3	15,0	14,5	7,0	16,0
25	3	12,0	11,0	11,0	20,0
26	3	15,0	17,0	17,0	19,0
27	3	14,0	12,0	14,0	12,0
28	3	12,0	15,0	11,0	•
29	3	10,0	9,0	10,0	•
30	3	21,0	17,0	16,0	13,0
31	3	23,0	17,0	18,0	15,0
32	3	14,0	18,0	16,0	16,0
33	3	22,0	20,0	21,0	22,0
34	3	13,0	13,0	15,0	19,0
35	4	10,0	8,0	10,0	13,0
36	4	14,0	15,0	14,0	13,0
37	4	18,0	19,0	14,0	10,0
38	4	8,0	11,0	10,0	9,0
39	4	11,0	10,0	10,0	12,0
40	4	13,0	15,0	20,0	22,0
41	4	18,0	16,0	17,0	•
42	4	12,0	17,0	20,0	22,0
43	4	6,0	4,0	6,0	4,0
44	4	18,0	14,0	11,0	•
45	4	12,0	16,0	13,0	16,0
46	4	15,0	19,0	19,0	•
47	4	14,0	16,0	13,0	12,0
48	4	19,0	6,0	13,0	11,0
49	4	11,0	16,0	12,0	15,0
50	5	1,0	9,0	8,0	2,0
51	5	17,0	15,0	19,0	17,0
52	5	10,0	13,0	11,0	12,0
53	5	19,0	18,0	20,0	•
54	5	5,0	4,0	5,0	12,0
55	5	19,0	20,0	21,0	16,0
56	5	15,0	17,0	22,0	11,0
57	5	5,0	5,0	3,0	8,0
58	5	10,0	15,0	18,0	23,0
59	5	6,0	8,0	5,0	11,0
60	5	7,0	11,0	12,0	10,0
61	5	14,0	21,0	13,0	•

CSX

1	1	6,0	5,0	5,0	3,0
2	1	9,0	8,0	11,0	9,0
3	1	5,0	4,0	4,0	7,0
4	1	0	2,0	3,0	2,0
5	1	6,0	6,0	5,0	4,0
6	1	7,0	6,0	9,0	•
7	1	0	0	2,0	5,0
8	1	5,0	5,0	4,0	6,0
9	1	8,0	7,0	4,0	7,0
10	1	6,0	7,0	8,0	9,0
11	2	8,0	7,0	7,0	9,0
12	2	9,0	9,0	11,0	7,0
13	2	6,0	7,0	7,0	8,0
14	2	6,0	7,0	8,0	5,0
15	2	7,0	7,5	5,0	5,0
16	2	6,0	6,0	6,0	6,0
17	2	1,0	2,0	4,0	•
18	2	0	2,0	0	•
19	2	12,0	15,0	13,0	12,0
20	2	11,0	4,0	8,0	7,0
21	2	8,0	8,0	12,0	9,0
22	2	10,0	6,0	4,0	1,0
23	3	8,0	10,0	9,0	5,0
24	3	2,0	3,5	5,0	5,0
25	3	5,0	5,0	8,0	6,0
26	3	3,0	4,0	4,0	1,0
27	3	4,0	5,0	6,0	6,0
28	3	7,0	6,0	6,0	7,0
29	3	7,0	7,0	5,0	•
30	3	3,0	3,0	3,0	•
31	3	6,0	9,0	7,0	5,0
32	3	15,0	15,0	12,0	7,0
33	3	6,0	9,0	9,0	7,0
34	3	9,0	8,0	8,0	8,0
35	3	5,0	4,0	3,0	6,0
36	4	4,0	4,0	4,0	3,0
37	4	7,0	0,0	0,0	8,0
38	4	10,0	14,0	11,0	7,0
39	4	2,0	4,0	2,0	4,0
40	4	5,0	4,0	6,0	6,0
41	4	7,0	6,0	6,0	9,0
42	4	8,0	6,0	8,0	•
43	4	5,0	8,0	6,0	7,0
44	4	8,0	3,0	3,0	1,0
45	4	7,0	5,0	7,0	•
46	4	5,0	4,0	5,0	7,0
47	4	7,0	7,0	9,0	•
48	4	3,0	3,0	4,0	5,0
49	4	4,0	4,0	8,0	8,0
50	4	3,0	3,0	4,0	7,0
51	5	5,0	4,0	4,0	5,0
52	5	5,0	3,0	4,0	5,0
53	5	6,0	8,0	6,0	8,0
54	5	4,0	5,0	6,0	•
55	5	4,0	1,0	5,0	8,0
56	5	4,0	8,0	8,0	4,0
57	5	10,0	8,0	7,0	6,0
58	5	4,0	3,0	3,0	4,0
59	5	5,0	8,0	7,0	6,0
60	5	7,0	6,0	6,0	6,0
61	5	7,0	6,0	7,0	8,0
62	5	8,0	6,0	8,0	•

CSXI

1	1	6,0	4,0	4,0	4,0
2	1	5,0	4,0	5,0	8,0
3	1	5,0	7,0	4,0	6,0
4	1	8,0	8,0	8,0	7,0
5	1	8,0	8,0	8,0	8,0
6	1	5,0	4,0	4,0	•
7	1	8,0	8,0	4,0	3,0
8	1	8,0	8,0	8,0	6,0
9	1	2,0	4,0	7,0	4,0
10	1	6,0	8,0	8,0	6,0
11	2	6,0	4,0	4,0	4,0
12	2	7,0	6,0	7,0	8,0
13	2	6,0	7,0	7,0	8,0
14	2	7,0	6,0	6,0	2,0
15	2	8,0	9,0	8,0	4,0
16	2	4,0	6,0	7,0	4,0
17	2	6,0	8,0	8,0	•
18	2	8,0	5,0	4,0	•
19	2	8,0	5,0	8,0	4,0
20	2	6,0	8,0	8,0	4,0
21	2	2,0	8,0	4,0	4,0
22	2	3,0	4,0	2,0	2,0
23	3	5,0	6,0	6,0	7,0
24	3	8,0	6,0	8,0	8,0
25	3	4,0	2,0	4,0	4,0
26	3	6,0	7,0	4,0	4,0
27	3	6,0	8,0	8,0	7,0
28	3	8,0	8,0	8,0	8,0
29	3	4,0	4,0	4,0	•
30	3	8,0	4,0	8,0	•
31	3	6,0	6,0	8,0	8,0
32	3	8,0	8,0	8,0	4,0
33	3	6,0	7,0	7,0	8,0
34	3	7,0	6,0	8,0	8,0
35	3	2,0	4,0	2,0	8,0
36	4	4,0	4,0	8,0	4,0
37	4	6,0	6,0	6,0	6,0
38	4	6,0	7,0	6,0	2,0
39	4	8,0	6,0	6,0	6,0
40	4	4,0	4,0	6,0	4,0
41	4	7,0	7,0	8,0	6,0
42	4	7,0	8,0	5,0	•
43	4	6,0	5,0	8,0	4,0
44	4	8,0	8,0	8,0	8,0
45	4	6,0	4,0	6,0	•
46	4	6,0	6,0	5,0	8,0
47	4	6,0	6,0	7,0	•
48	4	8,0	6,0	6,0	8,0
49	4	8,0	8,0	4,0	4,0
50	4	8,0	7,0	8,0	4,0
51	5	8,0	7,0	4,0	6,0
52	5	8,0	8,0	6,0	8,0
53	5	8,0	6,0	6,0	4,0
54	5	5,0	4,0	6,0	•
55	5	8,0	8,0	8,0	7,0
56	5	4,0	8,0	6,0	6,0
57	5	7,0	8,0	6,0	8,0
58	5	6,0	3,0	6,0	6,0
59	5	8,0	8,0	4,0	5,0
60	5	7,0	6,0	4,0	4,0
61	5	2,0	2,0	4,0	4,0
62	5	8,0	6,0	8,0	•

CSXV

1	1	7,0	7,0	7,0	7,0
2	1	7,0	7,0	8,0	7,0
3	1	4,0	4,0	5,0	5,0
4	1	8,0	8,0	7,0	8,0
5	1	8,0	8,0	8,0	8,0
6	1	6,0	4,0	8,0	•
7	1	8,0	7,0	8,0	8,0
8	1	5,0	4,0	8,0	0,0
9	1	8,0	7,0	8,0	8,0
10	1	8,0	7,0	8,0	4,0
11	2	7,0	8,0	8,0	0,0
12	2	7,0	7,0	8,0	8,0
13	2	7,0	6,0	8,0	6,0
14	2	8,0	6,0	6,0	6,0
15	2	8,0	7,0	6,0	7,0
16	2	6,0	7,0	6,0	6,0
17	2	6,0	7,0	8,0	•
18	2	8,0	7,0	8,0	•
19	2	7,0	8,0	7,0	7,0
20	2	8,0	8,0	8,0	4,0
21	2	8,0	6,0	8,0	6,0
22	2	6,0	7,0	8,0	8,0
23	3	8,0	6,0	6,5	6,0
24	3	8,0	7,0	8,0	7,0
25	3	8,0	8,0	8,0	5,0
26	3	8,0	8,0	7,0	8,0
27	3	7,0	7,0	8,0	8,0
28	3	7,0	7,0	8,0	8,0
29	3	7,0	7,0	8,0	•
30	3	8,0	6,0	0,0	•
31	3	8,0	8,0	8,0	8,0
32	3	6,0	6,0	7,0	7,0
33	3	8,0	8,0	7,0	6,0
34	3	6,0	6,0	8,0	8,0
35	3	7,0	7,0	6,0	7,0
36	4	5,0	6,0	5,0	8,0
37	4	8,0	7,0	6,0	7,0
38	4	7,0	4,0	5,0	3,0
39	4	8,0	8,0	8,0	6,0
40	4	8,0	8,0	8,0	8,0
41	4	8,0	8,0	8,0	5,0
42	4	7,0	8,0	6,0	•
43	4	6,0	7,0	7,0	6,0
44	4	8,0	8,0	6,0	7,0
45	4	8,0	7,0	7,0	•
46	4	8,0	6,0	6,0	7,0
47	4	6,0	6,0	6,0	•
48	4	8,0	6,0	6,0	8,0
49	4	8,0	8,0	8,0	7,0
50	4	7,0	7,0	8,0	7,0
51	5	5,0	7,0	6,0	4,0
52	5	8,0	8,0	6,0	8,0
53	5	8,0	6,0	7,0	6,0
54	5	8,0	8,0	8,0	•
55	5	8,0	8,0	8,0	8,0
56	5	6,0	8,0	8,0	8,0
57	5	5,0	8,0	6,0	4,0
58	5	7,0	5,0	8,0	6,0
59	5	8,0	8,0	8,0	8,0
60	5	8,0	8,0	8,0	6,0
61	5	7,0	7,0	6,0	8,0
62	5	8,0	5,0	7,0	•